| VEG | ETA" | TION - | Use | scientific | names | of plants. |
|-----|------|--------|-----|------------|-------|------------|
|-----|------|--------|-----|------------|-------|------------|

| | Absolute | Dominant | Indicator | |
|--|---------------|--------------------|-------------|--|
| Tree Stratum (Plot size: 30' radius) | % Cover | Species? | Status | Dominance Test worksheet: |
| Populus deltoides | <u>80</u> | | FAC | Number of Dominant Species |
| 2. Acer negundo | <u>25</u> | ⋈ | FACW | That are OBL, FACW, or FAC: 4 (A) |
| 3 | | | | Total Number of Dominant |
| 4 | - | 口 | | Species Across All Strata: <u>5</u> (B) |
| 5 | | 口 | | Percent of Dominant Species |
| 6 | | | | That Are OBL, FACW, or FAC: 80 (A/B) |
| 7 | | П | - | Prevalence Index worksheet: |
| | 105 | = Total Cove | | Total % Course of Multiple by |
| | | - rotar cove | 31 | Total % Cover of: Multiply by: |
| Sapling/Shrub Stratum (Plot size: 30' radius) | 22 | 521 | FACIL | OBL species x 1 = |
| Rhamnus cathartica (100% w/ shallow roots and butt.) | 33 | ⋈ | FACU | FACW species x 2 = |
| 2. Ulmus americana | 8 | | FACW | FAC species x 3 = |
| 3. Ribes americanum | 3 | П | <u>FACW</u> | FACU species x 4 = |
| 4 | | \Box | | UPL species x 5 = |
| 5 | | | | Column Totals: (A) (B) |
| 6, | 2 | \Box | T | Prevalence Index = B/A = |
| 7 | | | 2 - 11-27 | Hydrophytic Vegetation Indicators: |
| | 44 | = Total Cove | er | Rapid Test for Hydrophytic Vegetation |
| Herb Stratum (Plot size: 5' radius) | (80.00) | | 71 | □ Dominance Test is >50% □ Prevalence Index is =3.0¹ |
| Phalaris arundinacea | 60 | | FACW | ☐ Morphological Adaptations¹ (Provide supporting |
| Ribes americanum | 10 | | FACW | data in Remarks or on a separate sheet) |
| | 5 | | FACW | ☐ Problematic Hydrophytic Vegetation¹ (Explain) |
| 3. Solidago gigantea | 2 | _ | PACVV | 1 Indicators of hydric soil and wetland hydrology must |
| 4 | - | | _ | Be present, unless disturbed or problematic. |
| 5 | | я _. п Д | - | |
| 6 | | \Box | _ | Definitions of Vegetation Strata: |
| 7 | | | | Tree – Woody plants 3in. (7.6 cm) or more in diameter |
| 8 | | П | | at breast height (DBH), regardless of height |
| 9 | | П | | Saultandahan Wasabatatatan Bata |
| 10 | | | | Sapling/shrub – Woody plants less than 3in. DBH and greater than 3.28 ft (1 m) tall. |
| 11. | | | - | Supplied the first of the state |
| 12. | | - 🗀 | | Herb – All herbaceous (non-woody) plants, regardless |
| 1.60 | 75 | | | of size, and woody plants less than 3.28 ft tall. |
| | 75 | = Total Cove | ər | Woody vines - All woody vines greater than 3.28 ft in |
| Woody Vine Stratum (Plot size: 30' radius) | _ | | 200 | height |
| 1. Vitis riparia | <u>6</u> | ⋈ | FACW | |
| 2 | | П | | 9. N |
| 3 | | | | Hydrophytic |
| 4 | | . 🗆 | | Vegetation |
| | <u>6</u> | = Total Cove | er | Present? Yes ⊠ No □ |
| Remarks: (include photo number here or on a separate sheet | .) Fresh (wet | | | voods. Photo 57. |
| 5 | | | | F (4) |
| ¥ 9 | | | | · |
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| ¥ | | 5 | | |
| * * * * * * * * * * * * * * * * * * * | | 9 | | p. |
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| Depth | Matrix | | | Redox F | aatures | | | | | | |
|----------|---|---|--------------|---|---|-----------------------------|--------|---|---|---|-------------------|
| inches) | Matrix Color (moist) | % | Color (moist | | Type 1 | Loc² | Τe | exture | Re | emarks | |
| me: C=C | Concentration, D=Deple | etion PM=Re | duced Matrix | CS=Covered | d or Costed Sa | ad Graine | 21 | ocation: PL=Pore | Lining M-M | lateiv | - |
| | Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A7 Sandy Mucky Mineral (Sandy Gleyed Matrix (S Sandy Redox (S5) Stripped Matrix (S6) Dark Surface (S7) (LR | Surface (A11) 12) (S1) S4) R R, MLRA 14 | | MLRA 1 Thin Dark St Loamy Muck Loamy Gleye Depleted Ma Redox Dark Depleted Da Redox Depre | urface (S9) (LR ky Mineral (F1) ed Matrix (F2) atrix (F3) Surface (F6) rk Surface (F7) essions (F8) | R R, MLRA 149 (LRR K, L) | | 2 cm Muck (A10) Coast Prairie Rec 5 cm Mucky Peat Dark Surface (S7 Polyvalue Below Thin Dark Surfac Iron-Manganese Piesch Spodic (TA Red Parent Mate Very Shallow Dar Other (Explain in | dox (A16) (Li t or Peat (S3 ') (LRR K, L Surface (S8 e (S9) (LRR Masses (F1: lain Soils (F- A6) (MLRA 1 rial (TF2) rk Surface (T | LR K, L, R) () (LLR K, L,) () () (LRR K, L) K, L) (2) (LRR K, L 19) (MLRA 1 444, 145, 14 | R) , R) 49E |
| | of Hydrophytic vegetat Layer (if observed): | | nd hydrology | must be pres | ent, unless dist | urbed or probler | natic. | 1 | | | _ |
| Type: | 7 (8) | | | | | | Hydrid | Soil Present? | Yes 🛛 | No 🗆 | |
| | (inches): | | | | | | 1.7 | , , , , , , , , , , , , , , , , , , , | , 00 23 | | |
| marks: S | Soil profile is similar to I | No. 53, across | the road. |) | | | | | | | |
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WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region Project/Site: STH 59 West Bypass City/County: City and Town of Waukesha, Waukesha County Sampling Date: 09/08/2011 Applicant/Owner: State: WI Sampling Point: 55 Investigator(s): Donald M. Reed, PhD., SEWRPC Section, Township, Range: SW 1/4 Section 32, T7N, R19E Landform (hillslope, terrace, etc.): low terrace Local relief (concave, convex, none): none Slope (%): 0-2% Long: Datum: Soil Map Unit Name: Pella silt loam (Ph) Pd NWI classification: T3/E1K Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks) Are Vegetation____, Soil____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ⊠ No 🗆 Are Vegetation__ _, Soil____, or Hydrology ____ naturally problematic? (If, needed, explain any answers in Remarks.) SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc. Is the Sampled Area Hydrophytic Vegetation Present? ⊠Yes □No within a Wetland? Yes □No Hydric Soils Present? ⊠Yes □No Wetland Hydrology Present? ⊠Yes □No If yes, optional Wetland Site ID: PCA No. 27 Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days. HYDROLOGY Wetland Hydrology Indicators: Secondary Indicators (minimum of two required) Primary Indicators (minimum of one is required; check all that apply) ☐ Surface Soil Cracks (B6) Surface Water (A1) Drainage Patterns (B10) High Water Table (A2) Aquatic Fauna (B13) Moss Trim Lines (B16) \boxtimes Saturation (A3) Marl Deposits (B15) Dry-Season Water Table (C2) Water marks (B1) Hydrogen Sulfide Odor (C1) Crayfish Burrows (C8) Sediment Deposits (B2) Saturation Visible on Aerial Imagery (C9) ☐ Drift Deposits (B3) ☐ Presence of Reduced Iron (C4) Stunted or Stressed Plants (D1) ☐ Algal Mat or Crust (B4) Recent Iron Reduction in Tilled Soils (C6) Geomorphic Position (D2) \boxtimes Iron Deposits (B5) ☐ Thin Muck Surface (C7) Shallow Aquitard (D3) Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) Microtopographic Relief (D4) Sparsely Vegetated Concave Surface (B8) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Depth (inches): . Yes 🗌 No 🖂 Water Table Present? Yes 🖂 No 🗌 Depth (inches): 14.5 Saturation Present? Yes 🛛 No 🗆 Depth (inches): 0 (at surface) Wetland Hydrology Present? Yes X No \square (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: Soils saturated at the surface.

| VEGETATION – Use scientific names of plants. | | | | Sampling Point: 55 |
|--|-----------------|-----------------|-------------|--|
| 22) V267 738 1828 78 8 82826 183 37 90 13 | Absolute | | Indicator | 12 2 2 22 22 2 2 2 2 2 2 2 2 2 2 2 2 2 |
| Tree Stratum (Plot size: 30' radius) | % Cover | Species? | Status | Dominance Test worksheet: |
| 1 | | П | | Number of Dominant Species |
| 2 | · - | | _ | That are OBL, FACW, or FAC: 2 (A) |
| 3 | | | | Total Number of Dominant |
| 4 | | | | Species Across All Strata: 2 (B) |
| | | = | | 260 86 866 W 882 N |
| 5 | | ш | | Percent of Dominant Species |
| 6 | A | Д | - | That Are OBL, FACW, or FAC: 100 (A/B) |
| 7 | | | | Prevalence Index worksheet: |
| | <u>0</u> | = Total Cove | r | Total % Cover of: Multiply by: |
| 0 1 10 10 1 10 1 | | 10101 0010 | | Committee The Committee Co |
| Sapling/Shrub Stratum (Plot size: 30' radius) | 0 62 | <u>977-8</u> 9 | V00000 | OBL species x 1 = |
| 1. Salix exigua | 50 | ⋈ | OBL | FACW species x 2 = |
| 2 | | | | FAC species x 3 = |
| 3 | | П | | FACU species x 4 = |
| 4 | : | <u> </u> | 1 | |
| | | | _ | UPL species x 5 = |
| 5 | · · | П | | Column Totals: (A) (B) |
| 6 | | \Box | | Prevalence Index = B/A = |
| 7 | <u> </u> | | 4 | Hydrophytic Vegetation Indicators: |
| | 50 | = Total Cove | er. | Rapid Test for Hydrophytic Vegetation |
| Horb Strotum (Plot pizer E' sadius) | 1 | Total Cove | * | ☑ Dominance Test is >50% |
| Herb Stratum (Plot size: 5' radius) | 00 | 121 | ODI | ☐ Prevalence Index is =3.0¹ ☐ Morphological Adaptations¹ (Provide supporting |
| 1. Typha latifolia | 90 | | OBL | data in Remarks or on a separate sheet) |
| 2. Phalaris arundinacea | <u>15</u> | \Box | FACW | ☐ Problematic Hydrophytic Vegetation¹ (Explain) |
| 3. Aster lateriflorus | 1 | \Box | FACW | WE AND THE STATE OF THE STATE O |
| 3 | | | | 1 Indicators of hydric soil and wetland hydrology must |
| 4 | | | | Be present, unless disturbed or problematic. |
| 5 | S | П | _ | |
| 6, | | | 2 | Definitions of Vegetation Strata: |
| 7 | | | | Tree – Woody plants 3in. (7.6 cm) or more in diameter |
| 8 | | П | | at breast height (DBH), regardless of height |
| | | A-3: - | | |
| 9 | | | | Sapling/shrub – Woody plants less than 3in. DBH |
| 10 | - | П | | and greater than 3.28 ft (1 m) tall. |
| 11 | | | | Herb All herbaceous (non-woody) plants, regardless |
| 12 | | | | of size, and woody plants less than 3.28 ft tall. |
| | 106 | = Total Cove | | or one of the restay plants restar the control of t |
| 200 N 200 12W 20 22B 0 N 1 20B 10 0 0 1 | 100 | - Total Cove | " | Woody vines - All woody vines greater than 3.28 ft in |
| Woody Vine Stratum (Plot size: 30' radius) | | | | height |
| 1 | 1 (| | - | 2 |
| 2 | | | | |
| 3 | | П | | ************************************** |
| | | \equiv | | Hydrophytic Vegetation |
| 4 | 7 | ш | | Present? Yes ⊠ No □ |
| | <u>0</u> | = Total Cove | er | Tresent Tes A No L |
| Remarks: (include photo number here or on a separate she | et.) Shallow ma | arsh. Photo 58. | | * |
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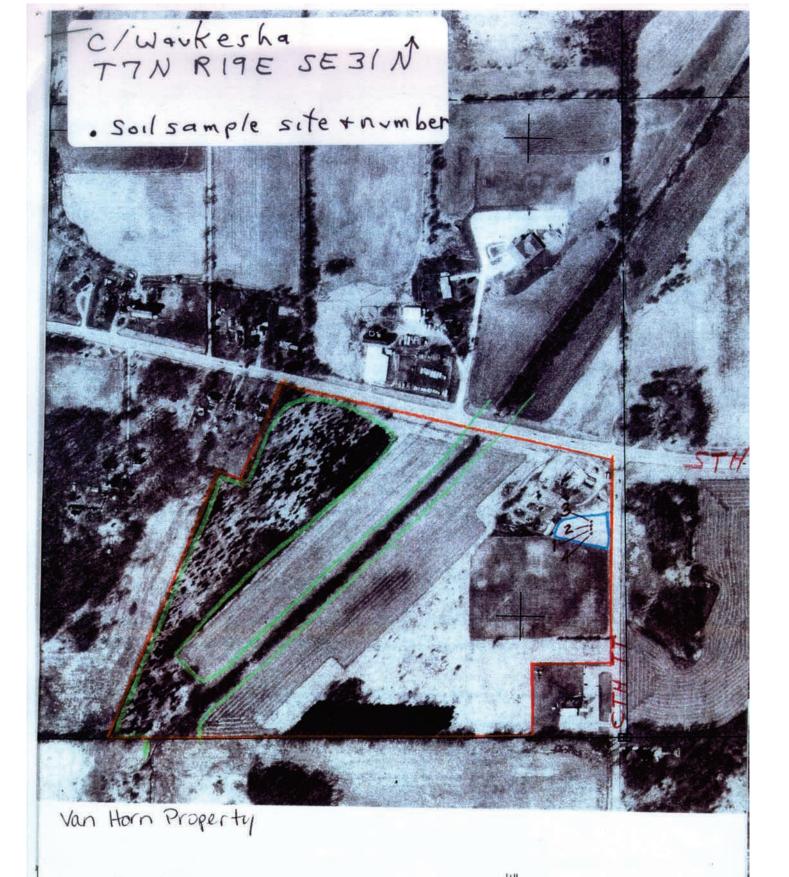
| nches) Color (moist) % Color (moist) % Type Loc² Texture Remarks N 2.5/0 100 7.5YR 4/4 c/p C PL Muck Fee Care Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains Today 5/1 c/d D M Refusal - dolomite bed Refusal - | Depth | M | atrix | | The second second | Redox Feat | | | | | | |
|--|------------------------------|--|--|------------|---|---------------|-------------------|------------------|------------|--------------------------------|---------------------------------|--|
| 11 N 2.5/0 100 7.5/R 4/4 or/p C PL Muck 10GY 5/1 of D M Clay 10GY 5/1 of D M Refusal - dolomite bed | inches) | Color (moi | st) % | Colo | r (moist) | % | Type ¹ | Loc ² | т т | exture | R | temarks |
| pe: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains Refusal - dolomite bed Refusal - dolomite R | 11 | N 2.5/0 | 100 | _ | | c/p | С | | 1000 | | | Dece: 100 100 100 100 100 100 100 100 100 10 |
| pee: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains Coation: PL=Pore Lining, M=Matrix | -17 | | | | | | - | | | | | |
| Refusal - dolomite bed Refus | | | | | | | - | | Oldy | | | |
| Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains Georgia Coated | 11. | | | | | | | - " | | 17.7.2 | Pefusal - dolo | mite hadrock? |
| Indicators for Problematic Hydric Soils Indicators for Problematic Hydric Soils Histosol (A1) | | - | | - | | | | | | | Kelusai - doic | offitte bedrock r |
| Indicators for Problematic Hydric Soils Indicators for Problematic Hydric Soils Histoso (A1) | | | | - | | - | | | | | | |
| Indicators for Problematic Hydric Soils Indicators for Problematic Hydric Soils Histosol (A1) | - | | | | - | - | | | | | | -12 |
| Indicators for Problematic Hydric Soils Indicators for Problematic Hydric Soils Histosol (A1) | | * * | | _ | | - | | - | | *** | | |
| Indicators for Problematic Hydric Soils Indicators for Problematic Hydric Soils Histoso (A1) | | 2 244 | | _ | | | | | | | - | |
| Indicators for Problematic Hydric Soils Indicators for Problematic Hydric Soils Histosol (A1) | | 0 W | | - | | | - | | | | · | |
| Indicators for Problematic Hydric Soils Indicators for Problematic Hydric Soils Histoso (A1) | | | | | - | | | _ | | | | |
| Indicators for Problematic Hydric Soils Indicators for Problematic Hydric Soils Histoso (A1) | | | | | | | | | | | | |
| Indicators for Problematic Hydric Soils Indicators for Problematic Hydric Soils Histosol (A1) | | 1 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | | - | | | | | | | | |
| Indicators for Problematic Hydric Soils Indicators for Problematic Hydric Soils Histosol (A1) | pe: C= | Concentration [| D=Depletion, R | M=Reduce | d Matrix C | S=Covered o | or Coated Sa | nd Grains | 2 | ocation: PI =P | ore Lining M=N | Antriv |
| Histosol (A1) | | | - sp. sustif () | | | | oodioo od | ria seranta | | | | |
| Black Histic (A3) | | | 7.00 | | ☐ Po | | | 88) (LRR R, | | 2 cm Muck (A | (10) (LRR K, L, | MLRA 149B) |
| Hydrogen Sulfide (A4) | | | | | | | | | | | | |
| Stratified Layers (A5) | | | | | | | | | | | | |
| □ Depleted Below Dark Surface (A11) □ Depleted Matrix (F3) □ Thin Dark Surface (S9) (LRR K, L) □ Thick Dark Surface (A12) □ Redox Dark Surface (F6) □ Iron-Manganese Masses (F12) (LRR Sandy Mucky Mineral (S1) □ Depleted Dark Surface (F7) □ Pledmont Floodplain Soils (F19) (MLRA 144A, 144 □ Sandy Redox (S5) □ Red Parent Material (TF2) □ Very Shallow Dark Surface (TF12) □ Dark Surface (S7) (LRR R, MLRA 149B) □ Other (Explain in Remarks) □ Other (Explain in Remarks) □ Other (Explain in Remarks) □ Depth (inches): 17 □ Pledmont Floodplain Soils (F19) (MLRA 144A, 144 □ New Company of the New Company of | | | - Sept. 10 (10) L. C. L. | | 10 minutes | | | (LRR K, L) | | | | |
| Thick Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLR Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145 Red Parent Material (TF2) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B) dicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. strictive Layer (if observed): Type: Dolomite bedrock? Depth (inches): 17 marks: | | | | (A11) | 1 <u></u> | | | | | | | |
| Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLFA 144A, 148 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 148 Red Parent Material (TF2) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) dicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. strictive Layer (if observed): Type: Dolomite bedrock? Depth (inches): 17 marks: | 2000 | | | | 1 | | | | | | | |
| Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 144 Redox Depressions (F8) Red Parent Material (TF2) Red Parent Material (TF2) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) dicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. strictive Layer (if observed): Type: Dolomite bedrock? Depth (inches): 17 marks: | | | | | ☐ De | epleted Dark | Surface (F7) | K. | | | | |
| Stripped Matrix (S6) □ Dark Surface (S7) (LRR R, MLRA 149B) □ Other (Explain in Remarks) □ Other (Expl | | | | | ☐ Re | edox Depress | sions (F8) | | | Mesic Spodic | (TA6) (MLRA | 144A, 145, 149I |
| □ Dark Surface (S7) (LRR R, MLRA 149B) □ Other (Explain in Remarks) dicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. strictive Layer (if observed): Type: Dolomite bedrock? Depth (inches): 17 marks: | | | | | | | | | | Pod Parent N | Antorial (TEO) | |
| dicators of Hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. strictive Layer (if observed): Type: Dolomite bedrock? Depth (inches): 17 marks: Hydric Soil Present? Yes 🗵 No [| 1 1 | | | | | | | | 4 () | | | |
| strictive Layer (if observed): Type: Dolomite bedrock? Depth (inches): 17 marks: Hydric Soil Present? Yes ⊠ No □ | Ħ | Dark Surface (S | (S6) | PA 140B) | | | | | 4 () | Very Shallow | Dark Surface (| TF12) |
| strictive Layer (if observed): Type: Dolomite bedrock? Depth (inches): 17 marks: Hydric Soil Present? Yes ⊠ No □ | | Dark Surface (S | (S6) 57) (LRR R, M I | RA 149B) | | | | | 4 () | Very Shallow | Dark Surface (| TF12) |
| Depth (inches): 17 marks: | | Dark Surface (S | 57) (LRR R, MI | | drology mu | st be presen | t, unless dist | urbed or pre | . E | Very Shallow | Dark Surface (| TF12) |
| marks: | dicators | Dark Surface (S of Hydrophytic e Layer (if obse | (LRR R, MI vegetation and erved): | | drology mu | st be presen | t, unless dist | urbed or pro | . E | Very Shallow | Dark Surface (| TF12) |
| | dicators strictive | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | (LRR R, MI vegetation and erved): | | drology mu | st be presen | t, unless dist | urbed or pro | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | No 🗆 |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | (LRR R, MI vegetation and erved): | | drology mu | st be presen | t, unless dist | urbed or pro | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | (LRR R, MI vegetation and erved): | | drology mu | st be presen | t, unless dist | urbed or pre | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | (LRR R, MI vegetation and erved): | | drology mu | ist be presen | t, unless dist | urbed or pro | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | (LRR R, MI vegetation and erved): | | drology mu | ist be presen | t, unless dist | urbed or pre | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | (LRR R, MI vegetation and erved): | | drology mu | ist be presen | t, unless dist | urbed or pre | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | (LRR R, MI vegetation and erved): | | drology mu | ist be presen | t, unless dist | urbed or pro | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | (LRR R, MI vegetation and erved): | | drology mu | ist be presen | t, unless dist | urbed or pro | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | (LRR R, MI vegetation and erved): | | drology mu | ist be presen | t, unless dist | urbed or pro | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | (LRR R, MI vegetation and erved): | | drology mu | ist be presen | t, unless dist | urbed or pro | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |
| | dicators strictive Type Dept | Dark Surface (Some of Hydrophytic of Layer (if observed): Dolomite bedre | 67) (LRR R, MI vegetation and erved): ock? | wetland hy | | | ¥ | | oblematic. | Very Shallow Other (Explain | Dark Surface (n in Remarks) | |

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region Project/Site: STH 59 West Bypass City/County: City and Town of Waukesha, Waukesha County Sampling Date: 09/08/2011 Applicant/Owner: State: WI Sampling Point: 56 Investigator(s): Donald M. Reed, PhD., SEWRPC Section, Township, Range: SE 1/4 Section 31, T7N, R19E Landform (hillslope, terrace, etc.): low terrace Local relief (concave, convex, none): none Slope (%): 0-2% Long: Datum: Soil Map Unit Name: Pella silt loam (Ph) Pd NWI classification: E2K Yes ⊠ No □ (If no, explain in Remarks) Are climatic/hydrologic conditions on the site typical for this time of year? Are Vegetation____, Soil____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes 🗌 No 🗆 Are Vegetation_ _, Soil____, or Hydrology _ _ naturally problematic? (If, needed, explain any answers in Remarks.) SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc. Is the Sampled Area Hydrophytic Vegetation Present? ⊠Yes □No within a Wetland? X Yes □No Hydric Soils Present? ⊠Yes □No Wetland Hydrology Present? ⊠Yes □No If yes, optional Wetland Site ID: PCA No. 26 Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days. **HYDROLOGY** Wetland Hydrology Indicators: Secondary Indicators (minimum of two required) Primary Indicators (minimum of one is required; check all that apply) Surface Soil Cracks (B6) Surface Water (A1) Water-Stained Leaves (B9) ☐ Drainage Patterns (B10) ☐ High Water Table (A2) ☐ Aquatic Fauna (B13) ☐ Moss Trim Lines (B16) ☐ Saturation (A3) Marl Deposits (B15) □ Dry-Season Water Table (C2) ☐ Water marks (B1) Hydrogen Sulfide Odor (C1) Crayfish Burrows (C8) Sediment Deposits (B2) Oxidized Rhizospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9) Drift Deposits (B3) Presence of Reduced Iron (C4) Stunted or Stressed Plants (D1) ☐ Algal Mat or Crust (B4) Recent Iron Reduction in Tilled Soils (C6) \boxtimes Geomorphic Position (D2) ☐ Iron Deposits (B5) Thin Muck Surface (C7) Shallow Aquitard (D3) Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) Microtopographic Relief (D4) Sparsely Vegetated Concave Surface (B8) \boxtimes FAC-Neutral Test (D5) Field Observations: Surface Water Present? Depth (inches): Yes 🗌 No 🛛 Water Table Present? No 🛛 Yes Depth (inches): Saturation Present? Yes 🗌 No 🛛 Depth (inches): _ Wetland Hydrology Present? No 🗌 (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks:

| VEGETATION - Use scientif | fic names of plants. |
|---------------------------|----------------------|
|---------------------------|----------------------|

| Tree Stratum (Plot size: 30' radius) | Absolute % Cover | Dominant Indicator Species? Status | Dominance Test worksheet: |
|--|---------------------------------------|---------------------------------------|--|
| 1 | 70 COVE | D Status | Number of Dominant Species |
| 2 | | | That are OBL, FACW, or FAC: 2 (A) |
| 30000 30 | | | |
| 3 | | <u>(1—1)</u> | Total Number of Dominant Species Across All Strata: 2 (B) |
| 4 | | <u> </u> | 200 000 000 000 000 000 000 000 000 000 |
| 5 | | <u> </u> | Percent of Dominant Species |
| 6 | | <u> </u> | That Are OBL, FACW, or FAC: 100 (A/B) |
| 7 | | | Prevalence Index worksheet: |
| 2 6 | <u>0</u> | = Total Cover | Total % Cover of: Multiply by: |
| Sapling/Shrub Stratum (Plot size: 30' radius) | | d t | OBL species x 1 = |
| 1 | | П — | FACW species x 2 = |
| 2 | | П | FAC species x 3 = |
| 3 | | | FACU species x 4 = |
| 4 | | | UPL species x 5 = |
| 5 | | | Column Totals; (A) (B) |
| 6 | | | Prevalence Index = B/A = |
| 7. | | | Hydrophytic Vegetation Indicators: |
| | | | Rapid Test for Hydrophytic Vegetation |
| W. F. 20.1 2007 St 27 40.50 St. | 0 | = Total Cover | ☑ Dominance Test is >50% |
| Herb Stratum (Plot size: 5' radius) | 100 | FACIAL | ☐ Prevalence Index is =3.0¹☐ Morphological Adaptations¹ (Provide supporting |
| 1. Phalaris arundinacea | 100 | | data in Remarks or on a separate sheet) |
| 2. Typha X glauca | 25 | | ☐ Problematic Hydrophytic Vegetation¹ (Explain) |
| 3 | - | | ¹ Indicators of hydric soil and wetland hydrology must |
| 4 | | Π | Be present, unless disturbed or problematic. |
| 5 | | | |
| 6 | | | Definitions of Vegetation Strata: |
| 7 | | | |
| | | | Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height |
| 8 | | <u> </u> | at 27 days (22.17), regardless of rieight |
| 9 | | Ц | Sapling/shrub – Woody plants less than 3in. DBH |
| 10 | - | <u> </u> | and greater than 3.28 ft (1 m) tall. |
| 11 | | П | Herb - All herbaceous (non-woody) plants, regardless |
| 12 | - | | of size, and woody plants less than 3.28 ft tall. |
| 2 2 | 125 | = Total Cover | Washington Allinoids to the Confession of the Co |
| Woody Vine Stratum (Plot size: 30' radius) | | | Woody vines – All woody vines greater than 3.28 ft in height |
| 1 | · · · · · · · · · · · · · · · · · · · | | |
| 2 | | □ | |
| 3 | | | LIVE TO THE PARTY OF THE PARTY |
| 4 | , 5 | | Hydrophytic Vegetation |
| 3 | . 0 | Total Cover | Present? Yes⊠ No □ |
| Remarks: (include photo number here or on a separate she | | = Total Cover | Landania and the second |
| The market (mode of prote name of the a separate site | ot.) i rosii (wo | tymeadow. y noto os. | |
| Ď. | | | |
| 5 | | | |
| | | | |
| | | .0 | |
| 4 | | | |
| (8) | | | |
| 9 " | | | |
| | | | |
| | | | |

| Depth | / | Matrix | | | Redox Fea | atures | | | | 40 |
|------------------|--|--|-------------------------------|-----------------|---|---|----------------------------|---|---|--|
| Depth inches) | Color (| | % | Color (moist) | | Type ¹ | Loc ² | Texture | Remark | 5 |
| | Concentration | | etion, RM=R | Reduced Matrix, | CS=Covered | or Coated Sar | nd Grains | ² Location: PL=Por Indicators for Probler | | |
| | Histosol (A1 Histic Epipe Black Histic Hydrogen S Stratified La Depleted Be Thick Dark S Sandy Muck Sandy Gley Sandy Redo Stripped Ma Dark Surfac | don (A2) (A3) ulfide (A4) yers (A5) elow Dark S Surface (A1 xy Mineral (ed Matrix (S ox (S5) ttrix (S6) e (S7) (LRI | 2) S1) S4) R R, MLRA |) | Loamy Mucky Loamy Gleyed Depleted Matr Redox Dark S Depleted Dark Redox Depres | 9B) face (S9) (LRF Mineral (F1) (d Matrix (F2) rix (F3) urface (F6) c Surface (F7) esions (F8) | R R, MLRA 149 LRR K, L) | 2 cm Muck (A1 Coast Prairie R 5 cm Mucky Pe Dark Surface (S Polyvalue Belo Thin Dark Surfa Iron-Manganes Piedmont Floor Mesic Spodic (S Red Parent Ma Very Shallow D Other (Explain | 0) (LRR K, L, MLRA ledox (A16) (LLR K, leat or Peat (S3) (LLR S7) (LRR K, L) w Surface (S8) (LRR ace (S9) (LRR K, L) e Masses (F12) (LR dplain Soils (F19) (M TA6) (MLRA 144A, 4 terial (TF2) lark Surface (TF12) | 149B) L, R) K, L, R) K, L, R) K, L, R LRA 149 |
| | e Layer (if | | on and wetl | and hydrology | must be preser | nt, unless distu | urbed or proble | 7 | | _ |
| 9.6793 8 | th (inches): _ | | | | | | | Hydric Soil Present? | Yes 🛛 No | |
| | | d data shee | ts for soils o | data taken from | Van Horn prop | perty field delir | neation on Sept | ember 28, 1999. | | |
| | | * s | | | | | | | | |
| | 39 | ż | | 3 | | era | | | 8 | \$1. 1 |
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| | | | | 2 | ¥ | 9 | | | | |
| | 5 | 8 | ¥ | ħ. | | ¥ . | | | | |
| | | | | | | | | | | |



2,458,000 6

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ORTHOPHOTOGRA

OT OTT OF TO

| PROJECT NAME: Van Horn Prof | perty | | FILE NO.: | | |
|---|---------|----------------------------|---|-----------------|-----------|
| LOCATION: City of Wankesha. | 'n | Jankes | hau county SE 1/4 SECTION | 31.77 | N. R 19 E |
| DATE: September 28, 1999 | | | ** | | |
| OBSERVERS: D.M. Read, K.I. Gris | swold, | C.J. J | ors; SEWRPC and Greg Bri | rese, D | NR |
| PLANT COMMUNITY AREA NO.: | | | | | |
| VEGETATION | | | | | - |
| Dominant Plant Species | Stratum | Indicator | Other <u>NON-Dominant</u> Plant Species | Stratum | Indicator |
| 1. Phalaris arundinaceo- | H | FAW+ | | | |
| 3. | | | | | |
| 4. | | 1 4 | | | |
| 5. | | | 300 | | |
| 6. | , | | | -54 161 200 154 | |
| 7. | i ji | | | | |
| 8. | | | | | |
| 9. | | | 000 0 1 1 0 8 9 9 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | | |
| 10. | 2.1 | 8 2 8 | | 10 | |
| Percent of Dominant Species that are OBL, FACS, or FAREBURN FOR Shares (West) Mean (West) | | ig FAC-) | 76 | | |
| HYDROLOGY | | | | | |
| Recorded Data (Describe in Remarks): Stream, Lake or Tide Gauge Aerial Photographs Other No Recorded Data Available | Ya. | - 10 A | Wetland Hydrology Indicators: Primary Indicators: Inundated Saturated in Root Zone Water Marks Drift Lines Sediment Deposits | | |
| Field Observations: Depth of Surface water: Depth of Soil Pit: Depth to Free Water in Pit: Depth to Saturated Soil Remarks NRCS WEXAND MAP Sho | mace | (in.) 22 (in.) (in.) (in.) | Drainage Patterns in Wetlands Floodways Secondary Indicators (2 or more required): Oxidized Root Channels in Root 2 Water-Stained Leaves Local Soil Survey Data FAC-Neutral Test Other (Explain in Remarks) | Zone | * |
| Remarks NRCS wetland map sho | ows an | lea as | "PC" (Prior Converted) | | 9 |

| SOILS | V | | | | |
|---|--|--|--|--|----------------------------|
| | ase): <u>Tel</u> | la sut loar | | Fi | ainage Class: |
| | | Typic Hapla | rquois | Ci | onfirm Mapped Type? Yes No |
| Profile Descripti Depth | on: | Matrix color | Redox concentration of | color Redox concentrati | ons |
| (Inches | Horizon | (Munsell Moist) | (Munsell Moist) | (Abundance/Contr | |
| 14-22" | - | N VO 2544/1 | 1-1-1 | | silly clay loan |
| 14-66 | | 254-71 | 104R 6/6 | Common/prom | mont clay |
| | | | | | |
| | | | | | |
| | | | | | |
| S A R G | listic Epipedo ulfidic Odor quic Moisture educing Con ileyed ow-Chroma (oils Field Indi | e Regime iditions Colors | Concretions High Organix Cor Organix Streaking Listed on Local H Listed on Nationa Other (Explain in | ydric Soils List al Hydric Soils List Remarks) | Soils |
| NRCS Mapped | Type: 0(| Debugger - Frankling in the State of the Land date | 10 1900 R GOLF RACE | | |
| Remarks: | .,,,,,, | | | | |
| Cucan | 0.11 | | A 12 - | | 1 (a. 1990) - 191 |
| curery | 5000 | s creator (| S HILLIN | luc Dark Surfa | <u> </u> |
| SITE CONDITIC | ONS | | | | |
| Do normal environment Yes No | onmental cor | nditions exist at the plant o, explain) | community? | Is the site a problem area? Yes No (if ye | s, explain) |
| Has the vegetati Yes No | on, soils, and | d/or hydrology been signi s, explain) | ficantly disturbed? | - | 4 8 9 |
| Remarks: (\(\sigma\) | arsh h | ay recently | | has a history | gof plowing. |
| WETLAND DET | ERMINATIO | N | | | |
| Based on the for | | | | | (Circle) |
| Hydrophytic Plan Wetland Hydrold Wetland Soils Pi | nts Dominan | t? Yes | No (Circle) No No | This sampling point is within | a wetland Yes No |
| Remarks: A | l wet | and indicator | requiremen | ts are prese | nt. |

| PROJECT NAME: Van Horn Pro | pert | > | FILE NO.: | į. | |
|---|--------------|-----------------|--|---------|-----------|
| PROJECT NAME: Van Horn Pro LOCATION: City of Wawkesha. | Wa | ukes | ha COUNTY SE 1/4 SECTION | 31.77 | N, R19_E |
| DATE: September 28, 1999 | | | | | |
| OBSERVERS: D. M. Reed, K.I. Griswol | | T-06 | SEWIRPE and Great Breese | DNE | _ |
| PLANT COMMUNITY AREA NO.: | | | | | |
| VEGETATION | ··· | ANGLOTINO | JAMI EL JITE NO | | |
| VEGETATION | | | | | |
| Dominant Plant Species | Stratum | Indicator | Other NON-Dominant Plant Species | Stratum | Indicator |
| 1. Prataris arundinaceo | H | FACUL+ | | | |
| 2. | | 1 10001 | | | |
| 3. | | 1 | | | |
| 4. | | | | | |
| | | | | 1 | |
| 5. | | | | | |
| 6. | ` | | | | |
| 7. | | 1 10 | | | |
| 8. | | | | | |
| 9. | | Carle Charles | | | |
| 10. | | - | | | |
| Percent of Dominant Species that are OBL, FACS, or FA | AC (Excludir | ng FAC-) (O | 072 | | |
| Remarks: Disturbed Evest (E) | | | | | |
| | | • | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| HYDROLOGY | | | | | |
| Recorded Data (Describe in Remarks): Stream, Lake or Tide Gauge | 4 | | Wetland Hydrology Indicators: Primary Indicators: | 8 | |
| Aerial Photographs Other | | | Inundated Saturated in Root Zone | | |
| No Recorded Data Available | | | Water Marks Drift Lines | | |
| No Recorded Data Available | | | Sediment Deposits | | |
| Field Observations: Depth of Surface water: | ÷ | (in.) | Drainage Patterns in Wetlands Floodways | | |
| Depth of Soil Pit: | | <u>23</u> (in.) | Secondary Indicators (2 or more required): Oxidized Root Channels in Root 2 | one . | |
| Depth to Free Water in Pit: | | (in.) | Water-Stained Leaves Local Soil Survey Data | | |
| Depth to Saturated Soil (at Su | inface | (in.) | FAC-Neutral Test Other (Explain in Remarks) | | |
| Depth to Saturated Soil (at Si Remarks NIZCS wetland map sh | ous a | rea as | "PC" (Prin Conversed) | | |
| No Di Maria | | | 2." × | | |

| SOILS | | SHIMITED AND SERVICE STREET | | N - | |
|---|--|---|---|---|-------------------------------------|
| Map Unit Name (Series and Pha | | | am | Field Obse | ervations (|
| Taxonomy (Sub | roup) | ypic Har | plaquolls | Confirm M | lapped Type? Yes No |
| Profile Description | on: | | | | |
| Depth (Inches | Horizon | Matrix color (Munsell Moist) | Redox concentration co (Munsell Moist) | olor Redox concentrations (Abundance/Contrast) | Texture Concretions, Structure, etc |
| 0-12" | | NYO | | Sulty clay loam | |
| 17-234 | | 2.574/1 | 10486/6 | common/prominent | clay' |
| USDA Hydrid So | stosol stic Epipedo ulfidic Odor quic Moisture educing Con- leyed ow-Chroma C ills Field India | e Regime iditions Colors icator: F5 . Th | Organix Streaking Listed on Local Hy Listed on National Other (Explain in F | tent in Surface Layer in Sandy Soils in Sandy Soils ydric Soils List Hydric Soils List Remarks) | |
| Do normal enviro | onmental con (If no | d/or hydrology been signi | 255 To 12 TO 97 1940 | Is the site a problem area? Yes No (if yes, explain | n) |
| | | hay recentu | g cut. Site | now history of | plowing. |
| WETLAND DETE | ERMINATIO | N . | | | |
| Based on the fore Hydrophytic Plan Wetland Hydrolo Wetland Soils Pro | its Dominant gy Present? | t? Yes | No (Circle) No No | This sampling point is within a wetland | d (Circle) Ves No |
| Remarks: All | wetta | nd inducation | requirement | ts are present. | |

| PROJECT NAME: Van Horn Pro | penti | 1 - | FILE NO.: | | |
|--|---------------|------------|--|---------------------|-----------|
| PROJECT NAME: Van Horn Pro LOCATION: City of Warkesha | . Wa | aukes | ha COUNTY SE 1/4 SECTION | 31 .T7 | N, R19 E |
| DATE: September 28, 1999 | | | | | 36.8 |
| OBSERVERS: D.M. RERG, KI GIVISI | word CT | Jorsis | SEWIZPC and Greg Brees | e, DN | iR_ |
| OBSERVERS: D.M. REED, KT 6/15/ | TB | RANSECT NO | .:SAMPLE SITE NO | .: <u> 3 </u> | |
| VEGETATION | 11 | | | | |
| Dominant Plant Species | Stratum | Indicator | Other NON-Dominant Plant Species | Stratum | Indicator |
| 1. Pa pratensis | H | PAC- | The state of the s | | |
| 2. | | | 1 | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | * | | |
| 6. | | | 7 | | |
| 7. | 4 | | | | |
| 8. | | | | | |
| 9. | | | | | |
| 10. | | | | | |
| Percent of Dominant Species that are OBL, FACS, or F | FAC (Excludin | ng FAC-) |)% | | |
| Remarks: Agricultural field. | | | | | g |
| , and a second s | | | | | |
| | | | | | |
| | | | | | |
| HYDROLOGY | | | | | |
| Recorded Data (Describe in Remarks):Stream, Lake or Tide Gauge Aerial Photographs Other | | · • * | Wetland Hydrology Indicators: Primary Indicators: Inundated Saturated in Root Zone | | |
| No Recorded Data Available | | | Water Marks Drift Lines Sediment Deposits | | |
| Field Observations: Depth of Surface water: | +9 | (in.) | Drainage Patterns in Wetlands | | |
| Depth of Soil Pit: | | 14 (in.) | Secondary Indicators (2 or more required): Oxidized Root Channels in Root Z | one! | |
| Depth to Free Water in Pit: | | (in.) | Water-Stained Leaves Local Soil Survey Data | | |
| Depth to Saturated Soil | | (in.) | FAC-Neutral Test Other (Explain in Remarks) | | |
| Remarks No wetland hydrolog Refusal at 14" dece to 1 | y undi | carro | observed. Soil is dry. | | |
| Refusal at 14" dere to 1 | sedroch | c. | | | |

| SOILS | | transi ya sinetiti — <u>Janesa II</u> | | | |
|---|---|---|---|--|-------------------------------------|
| | | lla sut loc | | Field Obse | ervations V |
| | | ypic Haple | aquolls | Confirm M | lapped Type? Yes No X |
| Profile Description | on: | | T | | |
| Depth (Inches | Horizon | Matrix color (Munsell Moist) | Redox concentration col (Munsell Moist) | lor Redox concentrations (Abundance/Contrast) | Texture Concretions, Structure, etc |
| 0-8" | | NVO | | | sut loan |
| 8-14" | | 2-54-4/1 | 104R6/6 | common/prominer | refusal-bedrock |
| Hi St Ad | licators: istosol istic Epipedo ulfidic Odor quic Moisture educing Con | e Regime | Bright Mottling with Concretions High Organix Conte Organix Streaking i | ent in Surface Layer in Sandy Soils in Sandy Soils | |
| G | leyed ow-Chroma (| Colors | Listed on National I Other (Explain in R | Hydric Soils List | 8 |
| NRCS Mapped T Remarks: | Гуре: Р | 7 | Table To Take | | |
| current | sous | <u>indicator</u> | 10 All. Deple | ted Below Park Su | n-face |
| SITE CONDITIO | NS | | | | |
| Do normal enviro | onmental cor | nditions exist at the plant o, explain) | community? | Is the site a problem area? Yes No (if yes, explain | n) |
| Yes No | (If ye | | - 56 - Ann Dean Statement Ann Deithe (1977) | | 2 2 1 |
| Remarks: Su | te ha | s a history | of plowing. | | |
| | | | | | |
| WETLAND DETE | ERMINATIO | N | | | |
| Based on the for Hydrophytic Plan Wetland Hydrolo Wetland Soils Pr | nts Dominant | t? Yes (| No (Circle) No No | This sampling point is within a wetlan | d (Circle) Yes No |
| Remarks: O | - JAC 98 | me wetland | indicator is y | nesert, Refusal | lat 14" due |

| THOUSE TANKE | openti | | FILE NO.: | | |
|--|--|------------|--|------------|-----------|
| PROJECT NAME: Van Horn Pr LOCATION: City of Wawkeston | , Wan | Tresha | COUNTY SE 1/4 SECTION | 31,T7 | N, R 19 E |
| DATE: September 28, 1999 | | | | | |
| OBSERVERS: DM Reed KI GVIS | sold, C | DOGUS | SEWEPL and Greg Brees | e, D1 | JR |
| OBSERVERS: D.M. Reed, KI GVIS | TF | RANSECTING | D.: SAMPLE SITE NO | D.: 4 | |
| VEGETATION | | | 1 | | |
| Dominant Plant Species | Stratum | Indicator | Other NON-Dominant Plant Species | Stratum | Indicator |
| 1. Par pratensis | + | FAC- | Phalaris arunduracea | F-1 | FACW+ |
| 3. | | | | | |
| 4. | 6 - Company of the co | | 100 | | |
| 5. | | | | | |
| 6. | | | - | 2 | |
| 7. | | | | * | |
| 8. | | 1 | | | |
| 9. | | | | TOTAL TAPE | |
| 10. | 7 | | | 71 21 | |
| | | | | | |
| Percent of Dominant Species that are OBL, FACS, of Remarks: Agricultural Fill | | ng FAC-) C | 276 | | |
| | | ng FAC-) C | 276 | | |
| Remarks: Agricultural Field | | ng FAC-) C | Wetland Hydrology Indicators: Primary Indicators: Inundated Saturated in Root Zone Water Marks Drift Lines | | |
| HYDROLOGY — Recorded Data (Describe in Remarks): — Stream, Lake or Tide Gauge — Aerial Photographs — Other No Recorded Data Available Field Observations: | | | Wetland Hydrology Indicators: Primary Indicators: Inundated Saturated in Root Zone Water Marks Drift Lines Sediment Deposits Drainage Patterns in Wetlands | | |
| HYDROLOGY Recorded Data (Describe in Remarks): Stream, Lake or Tide Gauge Aerial Photographs Other No Recorded Data Available | | (in.) | Wetland Hydrology Indicators: Primary Indicators: Inundated Saturated in Root Zone Water Marks Drift Lines Sediment Deposits Drainage Patterns in Wetlands Floodways Secondary Indicators (2 or more required): Oxidized Root Channels in Root 2 | Zone | |
| HYDROLOGY Recorded Data (Describe in Remarks): Stream, Lake or Tide Gauge Aerial Photographs Other No Recorded Data Available Field Observations: Depth of Surface water: | | (in.) | Wetland Hydrology Indicators: Primary Indicators: Inundated Saturated in Root Zone Water Marks Drift Lines Sediment Deposits Drainage Patterns in Wetlands Floodways Secondary Indicators (2 or more required): | Zone | |

| SOILS | | | | | |
|--|---|---|--|---|-------------------------------------|
| 1.2 | ase): | lla sut lo | | Field Obse | My arained |
| | - | ypic Hapl | aquous | COMMIN | apped type? res No_/_ |
| Profile Descript | tion: | Markin color | T. D. L | | r |
| Depth (Inches | Horizon | Matrix color (Munsell Moist) | Redox concentration co (Munsell Moist) | Redox concentrations (Abundance/Contrast) | Texture Concretions, Structure, etc |
| 0-8" | | NVO | | | sutloam (moist) |
| 8-18" | | N'/o | | | sut loam (dry) |
| 18-24" | | 2.544/1 | 10486/6 | common (prominent) | day |
| | - | | | | |
| | | | | | |
| | | | | | |
| | Histic Epipedo Sulfidic Odor Aquic Moisture Reducing Con Gleyed Low-Chroma (| e Regime ditions | Bright Mottling with Concretions High Organix Cont Organix Streaking Listed on Local Hy Listed on National Other (Explain in R | ent in Surface Layer in Sandy Soils in Sandy Soils dric Soils List Hydric Soils List | |
| USDA Hydrid S | oils Field Indi | cator: F5. T | hick Dark S | W. Cerro | |
| NRCS Mapped | Type: | PC | The board | To the time | |
| Remarks: | 1,77-1 | | | | |
| Current | sorts | indicator | is A.12 - | Thick Dark Surf | ace |
| SITE CONDITION | ONS | | | | |
| Do normal envi | ronmental cor | nditions exist at the plant, explain) | t community? | Is the site a problem area? Yes No (if yes, explain | 1) |
| Has the vegetal | tion, soils, and | d/or hydrology been sigr s, explain) | nificantly disturbed? | | 4 5 4 |
| Remarks: S | te ha | s a histor | ing of plowing | Ò | |
| | | | % ii |)) 34 | 0. |
| WETLAND DET | FERMINATIO | N | | | |
| Based on the fo | regoing, area | : | | | (Circle) |
| Hydrophytic Pla Wetland Hydrol Wetland Soils F | ints Dominant ogy Present? | | (Circle) No | This sampling point is within a wetland | |
| Remarks: | ny o | ne wetland | d indicator (| requirement is pr | esent. |
| | | | | | |

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region Project/Site: STH 59 West Bypass City/County: City and Town of Waukesha, Waukesha County Sampling Date: 09/08/2011 Applicant/Owner: Sampling Point: 57 Investigator(s): Donald M. Reed, PhD., SEWRPC Section, Township, Range: SE 1/4 Section 31, T7N, R19E Landform (hillslope, terrace, etc.): low terrace Local relief (concave, convex, none): concave Slope (%): 12-30% Lat: Long: Datum: Soil Map Unit Name: Ritchey silt loam (RkE) NWI classification: none Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks) Are Vegetation____, Soil____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ⊠ No 🗆 Are Vegetation____, Soil____, or Hydrology ____ naturally problematic? (If, needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. Hydrophytic Vegetation Present? Is the Sampled Area ⊠Yes □No Hydric Soils Present? □Yes within a Wetland? □No ⊠No Wetland Hydrology Present? ⊠Yes □No If yes, optional Wetland Site ID: PCA No. 28 Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days. HYDROLOGY Wetland Hydrology Indicators: Secondary Indicators (minimum of two required) Primary Indicators (minimum of one is required; check all that apply) Surface Soil Cracks (B6) ☐ Surface Water (A1) Drainage Patterns (B10) ☐ High Water Table (A2) ☐ Aquatic Fauna (B13) ☐ Moss Trim Lines (B16) ☐ Saturation (A3) ☐ Marl Deposits (B15) Dry-Season Water Table (C2) ☐ Water marks (B1) ☐ Hydrogen Sulfide Odor (C1) ☐ Crayfish Burrows (C8) Sediment Deposits (B2) □ Oxidized Rhizospheres on Living Roots (C3) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Drift Deposits (B3) Presence of Reduced Iron (C4) Stunted or Stressed Plants (D1) Algal Mat or Crust (B4) PHOTOS 60, 61 Recent Iron Reduction in Tilled Soils (C6) \boxtimes Geomorphic Position (D2) ☐ Iron Deposits (B5) Thin Muck Surface (C7) Shallow Aquitard (D3) ☐ Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks) Microtopographic Relief (D4) Sparsely Vegetated Concave Surface (B8) П FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes No 🖂 Depth (inches): Water Table Present? Yes No 🛛 Depth (inches): _ Saturation Present? Yes No 🛛 Depth (inches): Wetland Hydrology Present? Yes 🛛 No 🗆 (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: Site is a constructed drainage ditch. Photos 60 and 61.

| ١ | E/ | G | ET | A | TI | 0 | N | - Use | scientific | names | of | plants. |
|---|----|---|----|---|----|---|---|-------|------------|-------|----|---------|
|---|----|---|----|---|----|---|---|-------|------------|-------|----|---------|

| Tree Stratum (Plot size: 30' radius) | Absolute % Cover | Dominant Indicato Species? Status | Dominance Test worksheet: |
|---|------------------|--------------------------------------|--|
| 1 | | П | Number of Dominant Species |
| 2 | | □ | That are OBL, FACW, or FAC: 1 (A) |
| 3. | | | Total Number of Dominant |
| 4 | | | Species Across All Strata: 1 (B) |
| | 7 | | SE NE SE |
| 5 | | <u> </u> | Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B) |
| 6 | | <u> </u> | And the state of t |
| 7 | | | Prevalence Index worksheet: |
| | <u>O</u> | = Total Cover | Total % Cover of: Multiply by: |
| Sapling/Shrub Stratum (Plot size: 30' radius) | | | OBL species x 1 = |
| 1 | | | FACW species x 2 = |
| 2 | | | FAC species x 3 = |
| 3 | | | |
| | | | FACU species x 4 = |
| 4 | | <u> </u> | UPL species x 5 = |
| 5 | - | <u> </u> | Column Totals: (A) (B) |
| 6 | | | Prevalence Index = B/A = |
| 7 | | □ | Hydrophytic Vegetation Indicators: |
| 9 | <u>O</u> | = Total Cover | ☐ Rapid Test for Hydrophytic Vegetation☐ Dominance Test is >50% |
| Herb Stratum (Plot size: 5' radius) | | | ☐ Prevalence Index is =3.0¹ |
| 1. Typha angustifolia | <u>67</u> | | ☐ Morphological Adaptations¹ (Provide supporting |
| 2. Poa pratensis | <u>15</u> | FAC | data in Remarks or on a separate sheet) |
| 3. Epilobium coloratum | <u>5</u> | ☐ OBL | ☐ Problematic Hydrophytic Vegetation¹ (Explain) |
| N 986 247 D VV | | | ¹ Indicators of hydric soil and wetland hydrology must |
| 4. Polygonum persicaria | <u>5</u> | ☐ FACW | Be present, unless disturbed or problematic. |
| 5 | _ | | |
| 6 | | | Definitions of Vegetation Strata: |
| 7 | | | Tree – Woody plants 3in. (7.6 cm) or more in diameter |
| 8 | | | at breast height (DBH), regardless of height |
| 9 ; | | п | S-U-dahah Washalan lan Kan Dali |
| 10 | | | Sapling/shrub – Woody plants less than 3in. DBH and greater than 3.28 ft (1 m) tall. |
| 11 | | <u> </u> | 3.33.3 |
| | | | Herb - All herbaceous (non-woody) plants, regardless |
| 12 | | | of size, and woody plants less than 3.28 ft tall. |
| 250000 db ddah (6600 db (66000 b fed (60000 b fed (60000) | 92 | = Total Cover | Woody vines – All woody vines greater than 3.28 ft in |
| Woody Vine Stratum (Plot size: 30' radius) | | | height |
| 1 | | | A |
| 2 | | П | |
| 3 | - | □ | Hydrophytic |
| 4 | | П | Vegetation |
| | 0 | = Total Cover | Present? Yes ⊠ No □ |
| Remarks: (include photo number here or on a separate shee | | | |
| | 5 | | |
| " | | | |
| 139 | | | |
| | | | |
| | | | |
| , N | | | V |
| 4 | | | |
| 1/2 | | | |
| , x | | | |

| Depth | Matrix | | R | edox Feat | ures | | 34 | K |
|--------------------|--|-----------------------------------|--------------------------------|--|--|-----------------------------|---|--|
| nches) | Color (moist) | % C | Color (moist) | % | Type ¹ | Loc ² | Texture | Remarks |
| | | | | | | | | |
| | | | | | | | | |
| pe: C=C | Concentration, D=Deple | etion, RM=Red | uced Matrix, CS= | Covered o | r Coated San | d Grains | ² Location: PL=Pore I | |
| | Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (S Sandy Redox (S5) Stripped Matrix (S6) Dark Surface (S7) (LRI | 2) S1) S4) R R, MLRA 149 | Thin Loam Loam Deple Redo Redo | MLRA 149 Dark Surfa ny Mucky N ny Gleyed I eted Matrix nx Dark Su eted Dark S nx Depress | ice (S9) (LRF Mineral (F1) (I Matrix (F2) ((F3) rface (F6) Surface (F7) ions (F8) | R R, MLRA 149E LRR K, L) | 2 cm Muck (A10) Coast Prairie Rec 5 cm Mucky Peat Dark Surface (S7 Polyvalue Below Thin Dark Surface Iron-Manganese Piedmont Floodpl Mesic Spodic (TA Red Parent Mate | (LRR K, L, MLRA 149B) lox (A16) (LLR K, L, R) or Peat (S3) (LLR K, L, R)) (LRR K, L) Surface (S8) (LRR K, L) e (S9) (LRR K, L) Masses (F12) (LRR K, L, R) ain Soils (F19) (MLRA 149 6) (MLRA 144A, 145, 149 rial (TF2) k Surface (TF12) |
| strictive Type: | of Hydrophytic vegetati Layer (if observed): Gravel | on and wetland | hydrology must | be present | , unless distu | irbed or problem | atic. Hydric Soil Present? | Yes □ No ⊠ |
| | n (inches): <u>1"</u> " of muck in the surfac | e laver. Refus | al due to gravel | | | | | |
| | | П | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | <u> </u> | | |
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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region Project/Site: STH 59 West Bypass City/County: City and Town of Waukesha, Waukesha County Sampling Date: 09/08/2011 Applicant/Owner: _ State: WI Sampling Point: 58 Investigator(s): Donald M. Reed, PhD., SEWRPC Section, Township, Range: SE 1/4 Section 31, T7N, R19E Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 6-12% Long: Datum: Soil Map Unit Name: Hochheim Ioam (HmC2) Wd NWI classification: none Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks) Are VegetationX, SoilX, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes 🛛 No 🗆 Are Vegetation_____, Soil_____, or Hydrology _____ naturally problematic? (If, needed, explain any answers in Remarks.) SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc. Is the Sampled Area Hydrophytic Vegetation Present? ⊠Yes □No within a Wetland? ☐ Yes ⊠No Hydric Soils Present? □Yes ⊠No Wetland Hydrology Present? ⊠No □Yes If yes, optional Wetland Site ID: Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days. Disturbed vegetation due to regular mowing. Disturbed soils due to past filling for site development. HYDROLOGY Wetland Hydrology Indicators: Secondary Indicators (minimum of two required) Primary Indicators (minimum of one is required; check all that apply) ☐ Surface Soil Cracks (B6) ☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) ☐ Drainage Patterns (B10) ☐ High Water Table (A2) ☐ Aquatic Fauna (B13) Moss Trim Lines (B16) ☐ Saturation (A3) ☐ Marl Deposits (B15) □ Dry-Season Water Table (C2) ☐ Water marks (B1) ☐ Hydrogen Sulfide Odor (C1) Crayfish Burrows (C8) Sediment Deposits (B2) Oxidized Rhizospheres on Living Roots (C3) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Drift Deposits (B3) ☐ Presence of Reduced Iron (C4) Stunted or Stressed Plants (D1) ☐ Algal Mat or Crust (B4) ☐ Recent Iron Reduction in Tilled Soils (C6) Geomorphic Position (D2) ☐ Iron Deposits (B5) ☐ Thin Muck Surface (C7) Shallow Aquitard (D3) ☐ Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks) Microtopographic Relief (D4) Sparsely Vegetated Concave Surface (B8) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes No 🖂 Depth (inches): Water Table Present? Yes \boxtimes No Depth (inches): Saturation Present? Yes No 🛛 Depth (inches): Wetland Hydrology Present? (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: No hydrology indicators observed.

| ٧ | EGET | ATION | - Use | scientific | names | of | plants. |
|---|-------------|-------|-------|------------|-------|----|---------|
|---|-------------|-------|-------|------------|-------|----|---------|

| Tree Stratum (Plot size: 30' radius) | Absolute % Cover | Dominant Species? | Indicator Status | Dominance Test worksheet: |
|---|---------------------|----------------------|---------------------|--|
| 1. | | | Otatas | Number of Dominant Species |
| 2 | 1 / | | | That are OBL, FACW, or FAC: 1 (A) |
| 3 | | | | Total Number of Dominant |
| 4 | | | | Species Across All Strata: 1 (B) |
| 5 | | | | Percent of Dominant Species |
| 6 | | | - | That Are OBL, FACW, or FAC: 100 (A/B) |
| 7 | | | - | Prevalence Index worksheet: |
| | | | _ | |
| 1 | <u>O</u> | = Total Cover | | Total % Cover of: Multiply by: |
| Sapling/Shrub Stratum (Plot size: 30' radius) | | · · | 8 8 | OBL species x 1 = |
| 1 | | П | | FACW species x 2 = |
| 2 | _ | | - | FAC species x 3 = |
| 3 | | | | FACU species x 4 = |
| 4 | | | | UPL species x 5 = |
| 5 | | | | Column Totals: (A) (B) |
| 6 | - | | | Prevalence Index = B/A = |
| 7 | - | | <u> </u> | Hydrophytic Vegetation Indicators: |
| | <u>0</u> | = Total Cover | | Rapid Test for Hydrophytic Vegetation |
| Herb Stratum (Plot size: 5' radius) | | | | □ Dominance Test is >50% □ Prevalence Index is =3.0¹ |
| 1. Poa pratensis | 60 | \boxtimes | FAC | ☐ Morphological Adaptations¹ (Provide supporting |
| Parthenocissus quinquefolia | 20 | | FACU | data in Remarks or on a separate sheet) |
| 3. Daucus carota | 12 | | NI | ☐ Problematic Hydrophytic Vegetation¹ (Explain) |
| | | | | ¹ Indicators of hydric soil and wetland hydrology must |
| 4. Setaria glauca | <u>10</u> | П | FAC | Be present, unless disturbed or problematic. |
| 5. Cirsium arvense | <u>5</u> | П | FACU | Definitions of Manager State |
| 6 | - | П | | Definitions of Vegetation Strata: |
| 7 | _ | П | | Tree – Woody plants 3in. (7.6 cm) or more in diameter |
| 8 | | | | at breast height (DBH), regardless of height |
| 9 | | \Box | _ | Sapling/shrub Woody plants less than 3in. DBH |
| 10 | | Д . | | and greater than 3.28 ft (1 m) tall. |
| 11 | | | | Horb All borboscous (non-used) alerte secondina |
| 12 | | | | Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. |
| | 107 | = Total Cover | | 1 |
| Woody Vine Stratum (Plot size: 30' radius) | | (\$) | | Woody vines – All woody vines greater than 3.28 ft in |
| 1 | | П | | height |
| 2 | 1-11-11-1 | _ | | |
| 3 | | _ | | 800 00 A A |
| 4. | | | | Hydrophytic |
| 4 | | | | Vegetation Present? Yes ⊠ No □ |
| Remarks: (include photo number here or on a separate sheet. | 0 Mowed law | = Total Cover | | |
| termanes. (morage priote namber note of our a separate sneet. |) Wowed law | 11. F11010 03. | | * |
| 6 | | | | |
| | | | | |
| 8 | | | | * |
| 77 | | | | * |
| | | | | |
| 8 | | | | |
| 8 | 100 | | | |
| [™] , e | | | | |

| Depth | Matrix | | | | Redox Feat | | | | | | | | | |
|-------------------------------|---|-------------|----------------|-----------|--------------------------------|---------------|-----------------|----------|--|----------------------------|------------------------|-------------------------------------|-----------|-----------|
| nches) | Color (moist) | % | Color (| (moist) | % | Type | Loc2 | | Textu | ire | | Re | marks | |
| 4 | 10YR 2/1 | 80 | | 17.45 | | | NO. | Clay | PERSONAL PROPERTY OF THE PERSON NAMED IN COLUMN TWO IN COLUMN TO THE PERSON NAMED IN COLUMN TO T | = 111 | Fill ma | aterial | | |
| | 10YR 3/2 | 20 | | | | 1 1 1 1 | (6) | | | e de la constant | | La de Proposition de la constantina | | |
| 15 | 10YR 2/1 | 80 | 7.5YR 4/6 | 3 | c/p | С С | M | Clay | | | Fill ma | aterial | | |
| | 10YR 3/2 | 20 | | | | | | | | | - 0 | | | 11.22.7 |
| | | | | | | | | | | | | | | |
| | | <u> </u> | | | | | | | | | | | | |
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| | | | | | - | | - | - | | | - | | | |
| | | | | | | | | | 6 | | | | | |
| | | | | | | | | | | | 1 | | | |
| | | | | | 4 | | 2 2 2 2 2 | | | | | | | 15.1 |
| pe: C= | Concentration, D=Dep | oletion, RM | /=Reduced | Matrix, C | S=Covered or | r Coated Sar | nd Grains | | ² Loca | ition: PL=F | ore Lini | ng, M=Ma | atrix | |
| dric So | il Indicators: | | | pante no | ed a tiest | .500 M 9300 | conservation of | | dicator | s for Prob | lematic | Hydric S | ioils³: | Sem your |
| | Histosol (A1) | #0 | | ☐ Po | olyvalue Belov | | 8) (LRR R, | | | cm Muck (| | | | |
| | Histic Epipedon (A2) | | | П ть | MLRA 149 | | | 4400) | | oast Prairie | | | | |
| | Black Histic (A3) Hydrogen Sulfide (A4 | Y | | | nin Dark Surfa pamy Mucky N | | | (149B) | | cm Mucky | | | | L, R |
| | Stratified Layers (A5) | , | | | amy Mucky N amy Gleyed I | | (LKK K, L) | | | ark Surfac olyvalue B | | | | 1.1 |
| | Depleted Below Dark | Surface (A | A11) | | epleted Matrix | | | | | hin Dark Si | | | | L) |
| | Thick Dark Surface (A | | 11.17 | | edox Dark Su | | | | | on-Mangar | | | | (. L. F |
| | Sandy Mucky Mineral | | | | epleted Dark | | | | | iedmont Fl | | | | |
| | Sandy Gleyed Matrix | | | | edox Depress | | | | | lesic Spodi | | | | |
| | Sandy Redox (S5) | | | | | | | | | | | | | |
| | | | | | | | | | ☐ R | ed Parent | Material | (TF2) | | |
| | Stripped Matrix (S6) | | | | | | | | | ery Shallov | v Dark S | urface (T | F12) | |
| | | RR R, MLF | RA 149B) | | | | | | | | v Dark S | urface (T | F12) | |
| | Stripped Matrix (S6) Dark Surface (S7) (LF | | M san was w | rology mu | ust be present | . unless dist | urbed or pro | oblemati | | ery Shallov | v Dark S | urface (T | F12) | |
| dicators | Stripped Matrix (S6) | ation and v | M san was w | rology mu | ust be present | , unless dist | urbed or pro | oblemati | | ery Shallov | v Dark S | urface (T | F12) | H-H-H-H-L |
| dicators strictive Type | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) | ation and v | M san was w | rology mu | ist be present | , unless dist | urbed or pro | - | \ c. | ery Shallov | v Dark S iin in Rei | urface (T | F12) No ⊠ | |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pro | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | 1 |
| dicators strictive Type Dept | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | 1 |
| dicators strictive Type Dept | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pro | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | 1 |
| dicators strictive Type Dept | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | 3 |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | 1 |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 |] |
| dicators strictive Type Dept | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | 3 |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | 1 |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | 3 |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | 1 |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | 1 |
| dicators strictive Type Dept | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | |
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| dicators strictive Type Dept | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pro | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | |
| dicators strictive Type Dept | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pro | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | |
| dicators strictive Type Depti | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | |
| dicators strictive Type Dept | Stripped Matrix (S6) Dark Surface (S7) (LF of Hydrophytic vegeta a Layer (if observed) :: h (inches): | ation and v | vetland hydr | | | , unless dist | urbed or pre | - | \ c. | ery Shallov ther (Expla | v Dark S iin in Rei | urface (T marks) | 76 | |

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region Project/Site: STH 59 West Bypass City/County: City and Town of Waukesha, Waukesha County Sampling Date: 09/08/2011 Applicant/Owner: Sampling Point: 59 Investigator(s): Donald M. Reed, PhD., SEWRPC Section, Township, Range: SE 1/4 Section 31, T7N, R19E Landform (hillslope, terrace, etc.): drainageway Local relief (concave, convex, none): concave Slope (%): 0-2% Lat: Datum: Soil Map Unit Name: Pella silt loam, moderately shallow variant (Pm) Pd NWI classification: T3K Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks) Are Vegetation____, Soil____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ⊠ No 🗆 Are Vegetation____, Soil____, or Hydrology ____ naturally problematic? (If, needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. Hydrophytic Vegetation Present? Is the Sampled Area ⊠Yes □No within a Wetland? Hydric Soils Present? ⊠Yes □No ☑ Yes ☐ No Wetland Hydrology Present? ⊠Yes □No If yes, optional Wetland Site ID: PCA No. 29 Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days: HYDROLOGY Wetland Hydrology Indicators: Secondary Indicators (minimum of two required) Primary Indicators (minimum of one is required; check all that apply) Surface Soil Cracks (B6) ☐ Surface Water (A1) Drainage Patterns (B10) ☐ High Water Table (A2) Aquatic Fauna (B13) Moss Trim Lines (B16) ☐ Saturation (A3) ☐ Marl Deposits (B15) Dry-Season Water Table (C2) ☐ Water marks (B1) Hydrogen Sulfide Odor (C1) Crayfish Burrows (C8) Sediment Deposits (B2) ☐ Oxidized Rhizospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9) ☐ Drift Deposits (B3) Presence of Reduced Iron (C4) Stunted or Stressed Plants (D1) ☐ Algal Mat or Crust (B4) Recent Iron Reduction in Tilled Soils (C6) \boxtimes Geomorphic Position (D2) ☐ Iron Deposits (B5) Thin Muck Surface (C7) Shallow Aquitard (D3) Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) Microtopographic Relief (D4) Sparsely Vegetated Concave Surface (B8) \boxtimes FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes No 🖂 Depth (inches): _ Water Table Present? Yes 🗌 No 🛛 Depth (inches): Saturation Present? Yes 🛛 No \square Depth (inches): 13 Wetland Hydrology Present? Yes X No 🗌 (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks:

| Trop Stratum (Plot size) 20' redius) | Absolute | Dominant | Indicator | Deminence Test weeksheets |
|---|---------------|-------------|----------------|--|
| Tree Stratum (Plot size: 30' radius) 1. Acer negundo | % Cover 50 | Species? | Status FACW | Dominance Test worksheet: |
| | 20 | | FACW | Number of Dominant Species That are OBL, FACW, or FAC: <u>6</u> (A) |
| 2. Fraxinus pennsylvanica | 20 | ⊠ | | |
| 3. Prunus serotina | | | FACU | Total Number of Dominant Species Across All Strata: 8 (B) |
| 4. Acer saccharinum | <u>15</u> | | FACW | |
| 5 | | | - | Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B) |
| 6 | | | | Detected interestable with the second |
| 7 | 1 1 1 1 1 1 1 | | | Prevalence Index worksheet: |
| = | 105 | = Total Cov | er | Total % Cover of: Multiply by: |
| Sapling/Shrub Stratum (Plot size: 30' radius) | | | | OBL species x 1 = |
| 1. Viburnum opulus | <u>15</u> | \boxtimes | NI | FACW species x 2 = |
| 2. Rhamnus frangula | <u>8</u> | \boxtimes | FAC | FAC species x 3 = |
| 3. Lonicera x bella | <u>5</u> | | NI | FACU species x 4 = |
| 4. Rhamnus cathartica | <u>5</u> | | FACU | UPL species x 5 = |
| 5. Rosa palustris | 2 | П | OBL | Column Totals: (A) (B) |
| 6 | 10075 | \Box | | Prevalence Index = B/A = |
| 7 | 2-3-5-5 | П | | Hydrophytic Vegetation Indicators: |
| | <u>35</u> | = Total Cov | rer | Rapid Test for Hydrophytic Vegetation |
| Herb Stratum (Plot size: 5' radius) | | 1.5301.531 | | ☑ Dominance Test is >50% ☐ Prevalence Index is =3.0¹ |
| Phalaris arundinacea | 50 | | FACW | ☐ Morphological Adaptations¹ (Provide supporting |
| 2. Ribes americanum | 25 | \boxtimes | FACW | data in Remarks or on a separate sheet) |
| 3. Ambrosia trifida | <u>5</u> | | FAC | ☐ Problematic Hydrophytic Vegetation¹ (Explain) |
| | | | | ¹ Indicators of hydric soil and wetland hydrology must |
| 4. Geum canadense | <u>5</u> | | FAC | Be present, unless disturbed or problematic. |
| 5. Solidago gigantea | <u>5</u> | | FACW | Definitions of Vacatation Strate. |
| 6. Echinocystis lobata | <u>3</u> | | FACW | Definitions of Vegetation Strata: |
| 7. Helianthus tuberosa | 2 | | NI | Tree – Woody plants 3in. (7.6 cm) or more in diameter |
| 8. Thalictrum dasycarpum | 1 | , Д | <u>FACW</u> | at breast height (DBH), regardless of height |
| 9 | - | П | | Sapling/shrub – Woody plants less than 3in. DBH |
| 10 | | | | and greater than 3.28 ft (1 m) tall. |
| 11 | | П | | Herb – All herbaceous (non-woody) plants, regardless |
| 12 | | | | of size, and woody plants less than 3.28 ft tall. |
| * | <u>96</u> | = Total Cov | er | Wdi All d 10 200 ft |
| Woody Vine Stratum (Plot size: 30' radius) | | | | Woody vines – All woody vines greater than 3.28 ft in height |
| 1. Vitis riparia | 10 | \boxtimes | FACW | VEC.072 |
| 2 | 2-11112 | | | |
| 3 | | | | Hydrophytic |
| 4 | | | <u> </u> | Vegetation |
| 377 | 10 | = Total Cov | /er | Present? Yes ⊠ No □ |
| Remarks: (include photo number here or on a separate shee | | | | woods. Photo,64. |
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| (inches) 0-13 13-24 24-30 | Color (moist) | | | | Redox Featu | | | | | | | |
|------------------------------------|---|-----------|-------------|-------------|--------------------------|--|-------------------|----------|--------------------------|-------------------------|----------------|--|
| 13-24 | | % | Color (r | moist) | % | Type ¹ | Loc ² | | Texture | | Rem | arks |
| | 2.5Y 2.5/1 | 100 | | 1 | | | | Clay | | | 21 | and the second s |
| 24-30 | 7.5Y 2.5/1 | 100 | 10YR 5/6 | | c/p | С | М | Clay | | | | |
| | 10YR 4/1 | 100 | 10YR 5/6 | | m/p | С | М | Clay | | | | |
| | | | | | | 1 | | | | | - | |
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| M-11 - 1 | | | | | | | - | | | | | |
| Type: C=C | Concentration, D=Deple | etion, RM | =Reduced N | Matrix, CS: | =Covered or | Coated Sar | nd Grains | | ² Location: P | _=Pore Lir | ning, M=Matr | rix |
| lydric Soil | Indicators: | | | | | | | Ind | icators for Pi | oblemati | c Hydric Soi | ls³: |
| | Histosol (A1) | | | | value Below | | 8) (LRR R, | | | | RR K, L, MI | |
| | Histic Epipedon (A2) Black Histic (A3) | | | | MLRA 149E Dark Surfac | | D MI DA | | | | x (A16) (LLR | |
| N | Hydrogen Sulfide (A4) | | | | my Mucky M | | | 170 | | | LRR K, L) | LLR K, L, R) |
| □ s | Stratified Layers (A5) | | | | my Gleyed M | | | | | | urface (S8) (I | LRR K, L) |
| | Depleted Below Dark S | 000000 | (11) | | leted Matrix | | | 3 | ☐ Thin Dark | Surface | (S9) (LRR K | , L) |
| | Thick Dark Surface (A1 | | | | lox Dark Surf | | | | | | | (LRR K, L, R) |
| | Sandy Mucky Mineral (Sandy Gleyed Matrix (S | | | | leted Dark S | | | | | | | (MLRA 149E |
| | Sandy Redox (S5) | 34) | | L) Ked | lox Depressi | ons (Fo) | | | | odic (TA6 nt Materia | | A, 145, 149B |
| | Stripped Matrix (S6) | | | | | | | | | | Surface (TF | 12) |
| | Dark Surface (S7) (LR I | RR, MLR | (A 149B) | | | | | | | plain in R | | |
| Indicators (| of Hydrophytic vegetat | ion and w | otland bydr | ology muc | t be present | unlana distr | | | | | | |
| Restrictive | Layer (if observed): | ion and w | cuana nyare | ology musi | t be present, | uniess dist | indea or pro | blemauc. | | | | |
| Type: | | | | | | | | Hve | dric Soil Pres | ent? | Yes ⊠ | No 🗆 |
| | (inches): | | | | | Lanca de la visita della visita de la visita de la visita de la visita de la visita della visita de la visita de la visita de la visita de la visita della visita | | | | | | M.T. — |
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WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region Project/Site: STH 59 West Bypass Sampling Date: 09/08/2011 City/County: City and Town of Waukesha, Waukesha County Applicant/Owner: _ Sampling Point: 60 State: WI Investigator(s): Donald M. Reed, PhD., SEWRPC Section, Township, Range: NE 1/4 Section 31, T7N, R19E Landform (hillslope, terrace, etc.): stormwater pond Local relief (concave, convex, none): concave Slope (%): <u>1-3%</u> Lat: Datum: Long: Soil Map Unit Name: Pistakee silt loam (PrA) Spd NWI classification: -T3K Are climatic/hydrologic conditions on the site typical for this time of year? Yes \(\) No \(\) (If no, explain in Remarks) Are Vegetation____, Soil____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? No 🗆 _, Soil____, or Hydrology ____ naturally problematic? (If, needed, explain any answers in Remarks.) SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc. Is the Sampled Area Hydrophytic Vegetation Present? ΠNo within a Wetland? ⊠ Yes □No Hydric Soils Present? ⊠Yes □No Wetland Hydrology Present? ⊠Yes □No If yes, optional Wetland Site ID: PCA No. 30 Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days. Constructed stormwater detention **HYDROLOGY** Wetland Hydrology Indicators: Secondary Indicators (minimum of two required) Primary Indicators (minimum of one is required; check all that apply) Surface Soil Cracks (B6) Surface Water (A1) □ Water-Stained Leaves (B9) Drainage Patterns (B10) ☐ High Water Table (A2) Aquatic Fauna (B13) ☐ Moss Trim Lines (B16) Saturation (A3) Marl Deposits (B15) Dry-Season Water Table (C2) Water marks (B1) ☐ Hydrogen Sulfide Odor (C1) Crayfish Burrows (C8) Sediment Deposits (B2) Oxidized Rhizospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9) ☐ Drift Deposits (B3) ☐ Presence of Reduced Iron (C4) Stunted or Stressed Plants (D1) ☐ Algal Mat or Crust (B4) \boxtimes Recent Iron Reduction in Tilled Soils (C6) Geomorphic Position (D2) ☐ Iron Deposits (B5) Thin Muck Surface (C7) Shallow Aquitard (D3) \boxtimes Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks) Microtopographic Relief (D4) Sparsely Vegetated Concave Surface (B8) \boxtimes FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes 🛛 No Depth (inches): 7 Water Table Present? Yes 🗌 No 🗌 Depth (inches): Saturation Present? Yes No 🗆 Wetland Hydrology Present? Depth (inches): _ Yes 🛛 No 🗌 (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks:

| VEG | ETA | ٩T | 10 | N | - Use | scientific | names | of | plants. |
|-----|-----|----|----|---|-------|------------|-------|----|---------|
|-----|-----|----|----|---|-------|------------|-------|----|---------|

| Trop Stratum (Plat size) 201 radius) | Absolute | Dominant | Indicator | Dominance Test worksheet: |
|--|-----------------|--------------|-------------|--|
| Tree Stratum (Plot size: 30' radius) | % Cover | Species? | Status | 1967 S 1865 V 1866 W |
| 1 | - | | | Number of Dominant Species That are OBL, FACW, or FAC: 3 (A) |
| 2 | | | | |
| 3 | | П | _ | Total Number of Dominant |
| 4 | | \Box | | Species Across All Strata: 3 (B) |
| 5 | | | | Percent of Dominant Species |
| 6 | | П | | That Are OBL, FACW, or FAC: 100 (A/B) |
| 7 | | П | | Prevalence Index worksheet: |
| | <u>o</u> | = Total Cove | er | Total % Cover of: Multiply by: |
| Sapling/Shrub Stratum (Plot size: 30' radius) | | | | OBL species x 1 = |
| 1. Salix nigra | · <u>5</u> | \boxtimes | <u>OBL</u> | FACW species x 2 = |
| 2. Salix petiolaris | <u>5</u> | | FACW | FAC species x 3 = |
| PS60 (100 100 100 100 100 100 100 100 100 1 | | | N-1002 | TO DANGE CONTROL CONTR |
| 3 | | | 87 85 | FACU species x 4 = |
| 4 | | | | UPL species x 5 = |
| 5 | _ | | | Column Totals: (A) (B) |
| 6 | - | | | Prevalence Index = B/A = |
| 7 | (| | | Hydrophytic Vegetation Indicators: Rapid Test for Hydrophytic Vegetation |
| 9 | <u>10</u> | = Total Cov | er | ☑ Dominance Test is >50% |
| Herb Stratum (Plot size: 5' radius) | | | | ☐ Prevalence Index is =3.0¹ |
| 1. Scirpus validus | 33 | \boxtimes | OBL | Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) |
| 2. Alisma plantago-aquatica | <u>5</u> | | OBL | Problematic Hydrophytic Vegetation¹ (Explain) |
| Echinochloa crusgalli | 2 | | FACW | _ (2,000) |
| | 1 | | OBL | ¹ Indicators of hydric soil and wetland hydrology must |
| 4. Typha angustifolia | - | | Since 1 | Be present, unless disturbed or problematic. |
| 5 | | | - | Definitions of Vagetation Strate. |
| 6 | \ <u>\</u> | П | | Definitions of Vegetation Strata: |
| 7 | | | | Tree – Woody plants 3in. (7.6 cm) or more in diameter |
| 8 | | | | at breast height (DBH), regardless of height |
| 9 | | | | Sapling/shrub – Woody plants less than 3in. DBH |
| 10 | - | | | and greater than 3.28 ft (1 m) tall. |
| 11 | | | | La protection intermediates protections and activities the details interpretation and are no expensively |
| 12 | | | | Herb – All herbaceous (non-woody) plants, regardless |
| 12 | 41* | | | of size, and woody plants less than 3.28 ft tall. |
| | 41. | = Total Cov | er | Woody vines – All woody vines greater than 3.28 ft in |
| Woody Vine Stratum (Plot size: 30' radius) | | <u></u> | | height |
| 1 | - | Ш | | |
| 2 | | П | | |
| 3 | | П | | Hydrophytic |
| 4 | | \Box | | Vegetation |
| · · · · · · · · · · · · · · · · · · · | <u>0</u> | = Total Cov | er | Present? Yes ⊠ No □ |
| Remarks: (include photo number here or on a separate she | et.) * Chara (m | | | ple area substrate. Stormwater detention pond with |
| shallow marsh along the edge. Photo 65. | | | | T V |
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| Depth _ | Matrix | | | Redox Fea | | | | | |
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| (inches) | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | Texture | Remarks | S |
| Hydric Soil I ☐ Hi | oncentration, D=Deple Indicators: istosol (A1) istic Epipedon (A2) | etion, RM=R | | CS=Covered of Polyvalue Belo | ow Surface (S | | | | (149B) |
| H; | lack Histic (A3) ydrogen Sulfide (A4) tratified Layers (A5) epleted Below Dark S hick Dark Surface (A1 andy Mucky Mineral (andy Gleyed Matrix (S andy Redox (S5) tripped Matrix (S6) ark Surface (S7) (LRI f Hydrophytic vegetat | 2) S1) S4) R R, MLRA | | Loamy Mucky Loamy Gleyed Depleted Matri Redox Dark Su Depleted Dark Redox Depres | Mineral (F1) (Matrix (F2) x (F3) urface (F6) Surface (F7) sions (F8) | 3 | Dark Surface (S Polyvalue Belov Thin Dark Surfa Iron-Manganese Pledmont Flood Mesic Spodic (1 Red Parent Mat Very Shallow D Other (Explain i | v Surface (S8) (LRF ce (S9) (LRR K, L) e Masses (F12) (LR plain Soils (F19) (M FA6) (MLRA 144A, erial (TF2) ark Surface (TF12) | R K, L) R K, L, R LRA 1491 |
| estrictive L | _ayer (if observed): | | and nydrology n | lust be preser | it, uniess disti | | | | |
| Type: _ Depth (| (inches): | | | | | 2 | Hydric Soil Present? | Yes 🛛 No | |
| | ils inundated with 7" | of water, hyd | fric by definition | - Criteria 3. | | | | | |
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WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region Project/Site: STH 59 West Bypass City/County: City and Town of Waukesha, Waukesha County Sampling Date: 09/08/2011 Applicant/Owner: Sampling Point: 61 Section, Township, Range: NE 1/4 Section 31, T7N, R19E Investigator(s): Donald M. Reed, PhD., SEWRPC Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2-6% Long: Datum: Soil Map Unit Name: Theresa silt loam (ThB) Wd NWI classification: none Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks) Are Vegetation____, Soil____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes 🛛 No 🗆 Are Vegetation____, Soil____, or Hydrology ____ naturally problematic? (If, needed, explain any answers in Remarks.) SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc. Is the Sampled Area Hydrophytic Vegetation Present? □Yes ⊠No within a Wetland? Hydric Soils Present? ☐ Yes ⊠No □Yes ⊠No Wetland Hydrology Present? □Yes ⊠No If yes, optional Wetland Site ID: Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days. HYDROLOGY Wetland Hydrology Indicators: Secondary Indicators (minimum of two required) Primary Indicators (minimum of one is required; check all that apply) ☐ Surface Soil Cracks (B6) ☐ Surface Water (A1) Water-Stained Leaves (B9) Drainage Patterns (B10) ☐ High Water Table (A2) ☐ Aquatic Fauna (B13) ☐ Moss Trim Lines (B16) ☐ Saturation (A3) ☐ Marl Deposits (B15) Dry-Season Water Table (C2) ☐ Water marks (B1) ☐ Hydrogen Sulfide Odor (C1) ☐ Crayfish Burrows (C8) ☐ Sediment Deposits (B2) Oxidized Rhizospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9) ☐ Drift Deposits (B3) ☐ Presence of Reduced Iron (C4) Stunted or Stressed Plants (D1) ☐ Algal Mat or Crust (B4) Recent Iron Reduction in Tilled Soils (C6) Geomorphic Position (D2) ☐ Iron Deposits (B5) ☐ Thin Muck Surface (C7) Shallow Aquitard (D3) Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks) Microtopographic Relief (D4) Sparsely Vegetated Concave Surface (B8) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes No 🖂 Depth (inches): Water Table Present? Yes \boxtimes Depth (inches): Saturation Present? Yes No Depth (inches): Wetland Hydrology Present? Yes 🗌 No 🖂 (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: No hydrology indicators observed.

| ٧ | EGET | ATION | - Use | scientific | names of | plants |
|---|-------------|-------|-------|------------|----------|--------|
|---|-------------|-------|-------|------------|----------|--------|

| Tree Stratum (Plot size: 30' radius) 1. Juglans nigra | Absolute % Cover 33 | Dominant Species? ⊠ | Indicator Status NI | Dominance Test worksheet: Number of Dominant Species |
|--|---------------------------|---------------------------|---------------------------|--|
| Pinus resinosa (planted) | 25 | \boxtimes | FACU | That are OBL, FACW, or FAC: 3 (A) |
| Acer negundo | 10 | | FACW | = .6 % |
| The state of the s | 10 | | IAOW | Total Number of Dominant Species Across All Strata: 7 (B) |
| 4 | | 10000 | | And Andreas An |
| 5 | | | _ | Percent of Dominant Species That Are OBL, FACW, or FAC: 43 (A/B) |
| 6 | | | _ | The pro-easing property of the state of the |
| 7 | | | | Prevalence Index worksheet: |
| por the source of the court of a source of the books of | <u>68</u> | = Total Co | ver | Total % Cover of: Multiply by: |
| Sapling/Shrub Stratum (Plot size: 30' radius) | | | | OBL species x 1 = |
| 1. Rhamnus cathartica | <u>50</u> | \boxtimes | FACU | FACW species x 2 = |
| 2. Acer negundo | <u>10</u> | | FACW | FAC species x 3 = |
| 3. Morus alba | 2 | | FAC | FACU species x 4 = |
| 4 | | | | UPL species x 5 = |
| 5 | - | | - | Column Totals: (A) (B) |
| 6 | | 口 | | Prevalence Index = B/A = |
| 7 | | П | | Hydrophytic Vegetation Indicators: |
| | 62 | = Total Co | ver | Rapid Test for Hydrophytic Vegetation Dominance Test is >50% |
| Herb Stratum (Plot size: 5' radius) | | | | Prevalence Index is =3.01 |
| Parthenocissus quinquefolia | <u>25</u> | | FACU | ☐ Morphological Adaptations¹ (Provide supporting |
| 2. Alliaria officinalis | <u>15</u> | \boxtimes | FAC | data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain) |
| 3. Geum canadense | <u>15</u> | \boxtimes | FAC | Troblematic Hydrophytic Vegetation (Explain) |
| 2 (2 (2) (4) (2) (4) (4) (4) (4) | 6 | | FACU | ¹ Indicators of hydric soil and wetland hydrology must |
| 4. Smilacina racemosa | | _ | | Be present, unless disturbed or problematic. |
| 5. Ambrosia trifida | <u>5</u> | | FAC | Definitions of Vegetation Strata: |
| 6. Rhus radicans | <u>5</u> | П | FAC | John Monday Control of the Control o |
| 7. Circeae lutetiana | 3 | | FACU | Tree – Woody plants 3in. (7.6 cm) or more in diameter |
| 8. Ribes cynosbati | <u>3</u> | | NI | at breast height (DBH), regardless of height |
| 9. Rubus occidentalis | <u>3</u> | | NI | Sapling/shrub - Woody plants less than 3in. DBH |
| 10. <u>Vitis riparia</u> | 3 | | FACW | and greater than 3.28 ft (1 m) tall. |
| 11. Agrimonia gryposepela | 2 | П | <u>FACU</u> | Herb - All herbaceous (non-woody) plants, regardless |
| 12. Fraxinus pennsylvanica | 2 | П | FACW | of size, and woody plants less than 3.28 ft tall. |
| 8 | 89* | = Total Co | ver | Woody whose All woody wines greater than 2.29 ft in |
| Woody Vine Stratum (Plot size: 30' radius) | | | | Woody vines – All woody vines greater than 3.28 ft in height |
| 1. Vitis riparia | <u>15</u> | \boxtimes | FACW | |
| 2. Parthenocissus quinquefolia | <u>3</u> | | FACU | . J |
| 3 | | | | Hydrophytic |
| 4 | | | | Vegetation |
| | <u>18</u> | = Total Co | ver | Present? Yes □ No ⊠ |
| Remarks: (include photo number here or on a separate shee | | | | Arisaema triphyllum (1%) FACW and Aster lateriflorus |
| (1%) FACW. Upland hardwoods and buckthorn thicket. Photo | o 66. | | | 178 MALL NO 19526 14 15 175 15 500, A VI E |
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| Depth | escription: (Desc Ma | | - - - - - - - - - - - - - - | - 10 docui | Redox Fea | | min the ab | aence of I | nulcators.) | | | |
|-----------|---------------------------------------|---|--|---------------|-------------------------|-------------------|--|------------|---|---|---------------|------|
| (inches) | | | Cole | or (moist) | % | Type ¹ | Loc ² | Т | exture | R | emarks | |
| 0-10 | 10YR 3/2 | 100 | | | | - | | Silt loam | | | omarko | |
| 10-12 | 7.5YR 3/3 | 100 | 78 . | | | - | | Silty clay | | | | |
| 12 | | | _ | | | 1—c10111 | | City city | | Refusal | | |
| | - | | | | | | | | | rtolusui | T.V. History | |
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| ¹Timo: C | =Concentration, D | =Dopleties F | NA=Doduce | ad Matelia C | 0-0 | | 10 | 2 | | | | - |
| | oil Indicators: | -Depletion, r | (IVI-Reduce | ed Matrix, C. | 5=Covered o | or Coated Sa | nd Grains | | Location: PL=Po ators for Proble | | | |
| | | | | ☐ Po | lyvalue Belo | w Surface (S | 88) (LRR R, | | 프레이 이 그렇게 되었다면 하면 하는데 얼마나 가는 아이를 했다고 말했다면 뭐 했다. | | |) |
| | Histic Epipedon (| | | | MLRA 149 | 9B) | VIII AND | | | | | |
| | Black Histic (A3) | | | | | | R R, MLRA | | | eat or Peat (S | 3) (LLR K, L, | R) |
| H | Hydrogen Sulfide Stratified Layers | | | | amy Mucky amy Gleyed | Mineral (F1) | (LRR K, L) | | 7 1 had 200 at 10 had 1400 | | | |
| | Depleted Below | | (A11) | | epleted Matri | | | | 그 그 그 아이를 하는 것이 하는데 하시네요. | | | |
| | Thick Dark Surfa | | | | dox Dark Su | | | | 프로그램 시간 시간 시간 (요즘 그리지 않는 것이 없는데 없다. | | | . R) |
| | Sandy Mucky Mi | | | | | Surface (F7 |) | | Piedmont Floo | dplain Soils (F | 19) (MLRA 1 | 49B) |
| | Sandy Gleyed M | | | ☐ Re | edox Depres | sions (F8) | | | | (TA6) (MLRA 1 | 144A, 145, 14 | 19B) |
| | Sandy Redox (S: Stripped Matrix (| | | | | | | | | | TE40\ | |
| | Dark Surface (S7 | | LRA 149B) |) | | | | | 그 | | 1 [12) | |
| 2. | | | | | | | | - | • (Managarana) • (Managarana) | 100000000000000000000000000000000000000 | | |
| Indicator | rs of Hydrophytic vo | egetation and | wetland h | ydrology mu | st be preser | it, unless dis | urbed or prot | olematic. | | | | |
| | e: dry, hard soil (c | 3 () () () () () () () () () (| | | | | | Hydr | ic Soil Present? | Yes 🗌 | No 🖂 | |
| | pth (inches): 12 | | | | | | | V-5000 | | | | |
| Remarks | : Refusal at 12" usi | ing sharp-sho | oter and so | oil probe due | to ultra dry | conditions.U | pland soils pr | esent. | a 1 2 | | | |
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WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region Project/Site: STH 59 West Bypass City/County: City and Town of Waukesha, Waukesha County Sampling Date: 09/08/2011 Applicant/Owner: _ State: WI Sampling Point: 62 Investigator(s): Donald M. Reed, PhD., SEWRPC Section, Township, Range: NE 1/4 Section 31, T7N, R19E Landform (hillslope, terrace, etc.): low terrace Local relief (concave, convex, none): none Slope (%): 2-6% Lat: Long: Datum: Soil Map Unit Name: Knowels silt loam (KwB) Wd NWI classification: T3K Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks) Are Vegetation____, Soil____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes 🛛 No 🗆 ___, Soil____, or Hydrology X naturally problematic? (If, needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. Is the Sampled Area Hydrophytic Vegetation Present? ⊠Yes □No □No within a Wetland? Yes Hydric Soils Present? □No ⊠Yes Wetland Hydrology Present? □No ⊠Yes If yes, optional Wetland Site ID: PCA No.31 Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days. Potential seasonal groundwater discharged area that has been altered by past ditching. HYDROLOGY Wetland Hydrology Indicators: Secondary Indicators (minimum of two required) Primary Indicators (minimum of one is required; check all that apply) ☐ Surface Soil Cracks (B6) ☐ Surface Water (A1) ☐ Water-Stained Leaves (B9) Drainage Patterns (B10) ☐ High Water Table (A2) ☐ Aquatic Fauna (B13) Moss Trim Lines (B16) ☐ Saturation (A3) ☐ Marl Deposits (B15) Dry-Season Water Table (C2) Water marks (B1) ☐ Hydrogen Sulfide Odor (C1) Crayfish Burrows (C8) Sediment Deposits (B2) ☐ Oxidized Rhizospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9) □ Drift Deposits (B3) ☐ Presence of Reduced Iron (C4) ☐ Stunted or Stressed Plants (D1) ☐ Algal Mat or Crust (B4) Recent Iron Reduction in Tilled Soils (C6) \boxtimes Geomorphic Position (D2) ☐ Iron Deposits (B5) ☐ Thin Muck Surface (C7) Shallow Aquitard (D3) Inundation Visible on Aerial Imagery (B7) ☐ Other (Explain in Remarks) Microtopographic Relief (D4) Sparsely Vegetated Concave Surface (B8) □ FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes No 🛛 Depth (inches): Water Table Present? Yes 🗌 No \boxtimes Depth (inches): _ Saturation Present? Yes No 🛛 Depth (inches): _ Wetland Hydrology Present? Yes 🛛 No 🗌 (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: Seasonal hydrology.

| Tree Stratum (Plot size: 30' radius) | | Absolute % Cover | Dominant Species? | Indicator | Dominance Test worksheet: |
|--|---------------|------------------|----------------------|----------------|--|
| 1. Acer negundo | | % Cover 50 | Species? | Status FACW | Number of Dominant Species |
| Ulmus americana | | 25 | ⊠ | FACW | That are OBL, FACW, or FAC: 5 (A) |
| Fraxinus pennsylvanica | | 10 | | FACW | |
| | | 10 | | NI | Total Number of Dominant Species Across All Strata: <u>5</u> (B) |
| 4. Juglans nigra | | <u>10</u> | | FACW | 5 50% 5 |
| 5. Thuja occidentalis | | | | | Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B) |
| 6. Prunus serotina | | <u>5</u> | | FACU | Was to the first the same of t |
| 7 | | 440 | | | Prevalence Index worksheet: |
| 1 E | | 110 | = Total Cove | er | Total % Cover of: Multiply by: |
| Sapling/Shrub Stratum (Plot size: 30' radius) | | 8985 | 1000 | | OBL species x 1 = |
| 1. Acer negundo | | <u>25</u> | ⋈ | FACW | FACW species x 2 = |
| 2. Prunus serotina | 2.2 | <u>6</u> | | FACU | FAC species x 3 = |
| 3. Crataegus sp. | | <u>5</u> | , П | NI | FACU species x 4 = |
| 4. Rhamnus cathartica | | <u>3</u> | | <u>FACU</u> | UPL species x 5 = |
| 5. Fraxinus pennsylvanica | | 2 | , П | FACW | Column Totals: (A) (B) |
| 6. Lonicera x bella | | 2 | | NI | Prevalence Index = B/A = |
| 7. Rubus occidentalis | | 2 | | NI | Hydrophytic Vegetation Indicators: |
| - 1 th | | <u>45</u> | = Total Cove | er | ☐ Rapid Test for Hydrophytic Vegetation ☐ Dominance Test is >50% |
| Herb Stratum (Plot size: 5' radius) | | | | | Prevalence Index is =3.01 |
| 1. Impatiens capensis | | 50 | \boxtimes | FACW | ☐ Morphological Adaptations¹ (Provide supporting |
| 2. Phalaris arundinacea | | 40 | | FACW | data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain) |
| 3. Ribes americanum | | <u>5</u> | | FACW | Section 19 County Section Plane Who is a secretary and a section of the section o |
| 4. Alliaria officinalis | | 2 | | FAC | ¹ Indicators of hydric soil and wetland hydrology must |
| 5. Geum canadense | | <u>2</u> | | FAC | Be present, unless disturbed or problematic. |
| | | <u>2</u> | | NI | Definitions of Vegetation Strata: |
| 6. Rubus occidentalis | | 4 | | 141 | NOT CONTROL OF THE PROPERTY OF |
| 7 | | | | | Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height |
| 8 | | | | _ | at breast neight (DBH), regardless of neight |
| 9 | | | П | | Sapling/shrub – Woody plants less than 3in. DBH |
| 10 | | | П | | and greater than 3.28 ft (1 m) tall. |
| 11 | | - | | | Herb - All herbaceous (non-woody) plants, regardless |
| 12 | | | | | of size, and woody plants less than 3.28 ft tall. |
| | | 101 | = Total Cove | er | Woody vines - All woody vines greater than 3.28 ft in |
| Woody Vine Stratum (Plot size: 30' radius) | | | | | height |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | Hydrophytic |
| 4 | | 7. | | | Vegetation |
| | 20 | <u>0</u> | = Total Cove | | Present? Yes ⊠ No □ |
| Remarks: (include photo number here or on a se | parate sheet. |) Lowland ha | ardwoods. Phot | to 67. | |
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| Depth | Matrix | 1 | | | Redox Feat | | | -0 | | | |
|-------------------------------|---|--------------------------|--|------------|-------------------|---------------------|------------------|-------------------|---|--|--|
| nches) | Color (moist) | % | Color | (moist) | % | Type ¹ | Loc ² | 7 | exture | , F | Remarks |
| 7 | 2.5Y 2.5/1 | 100 | | | | | | Silt loam | | | |
| 5 | 7.5YR 3/1 | 100 | _ | | | 2. | | Silt loam | | 4 | 18 |
| 20 | 7.5YR 3/2 | 100 | 10YR 3/1 | | c/f | D | М | Clay loam | | | |
| | | | (A) (1) (A) (A) (A) (A) (A) (A) (A) (A) (A) (A | | | | | 3 1 | | | |
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| | Concentration, D=De | pletion, RM | 1=Reduced | Matrix, CS | =Covered o | r Coated San | d Grains | | Location: PL=Por | | |
| | il Indicators: | | | - P-1 | and a Date | 0 / 0 / | | _ | ators for Problem | | |
| | Histosol (A1) Histic Epipedon (A2) | | | ☐ Pol | MLRA 149 | w Surface (S8 B) |) (LKK K, | E | 프로그램에 다시아 나는 아이를 살아 있다. | | |
| | Black Histic (A3) | | | ☐ Thir | | ice (S9) (LRF | R, MLRA | The second second | | | 3) (LLR K, L, R) |
| | Hydrogen Sulfide (A4 | | | | | /lineral (F1) (I | | Ë | 프리트 - [1] - [8] (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) | | |
| | Stratified Layers (A5) | | | | my Gleyed | | | | | | |
| | Depleted Below Dark | | A11) | 10 | oleted Matrix | 1/1/A/ 1/6/2009 | | | 하다 그 내가 있었다. 얼마 맛이 얼마 나가면 뭐라게 되었어요. | | |
| | Thick Dark Surface (A | | | | dox Dark Su | | | F | | | 12) (LRR K, L, R) |
| | Sandy Mucky Minera Sandy Gleyed Matrix | | | | dox Depress | Surface (F7) | | | | | F19) (MLRA 149E 144A, 145, 149 B |
| | | (04) | | | | | | | T MESIC ODOGIC (| IVO) (INITIVE | 144M, 140, 140D |
| | Sandy Redox (S5) | m _y | | | JOX DODIOGO | 10113 (1 0) | | Г | | | THE PROPERTY OF THE PROPERTY O |
| | Sandy Redox (S5) Stripped Matrix (S6) | 74 | | | 30X B 0 p 1 0 0 0 | 10113 (1 0) | | | Red Parent Ma | aterial (TF2) | |
| | | 7 | RA 149B) | | 30x Bopi 000 | 10113 (1 0) | | | Red Parent Ma Very Shallow D | aterial (TF2) Dark Surface | |
| | Stripped Matrix (S6) Dark Surface (S7) (L | RR R, MLF | | | G | 7 (2) (400 °C) | | | Red Parent Ma Very Shallow D | aterial (TF2) Dark Surface | |
| dicators | Stripped Matrix (S6) Dark Surface (S7) (L | RR R, MLF | | | G | 7 (2) (400 °C) | rbed or pro | | Red Parent Ma Very Shallow D | aterial (TF2) Dark Surface | |
| dicators | Stripped Matrix (S6) Dark Surface (S7) (L of Hydrophytic veget e Layer (if observed | RR R, MLF | | | G | 7 (2) (400 °C) | rbed or pro | oblematic. | Red Parent Ma Very Shallow D Other (Explain | aterial (TF2) Dark Surface in Remarks) | (TF12) |
| dicators strictive Type | Stripped Matrix (S6) Dark Surface (S7) (L | RR R, MLF | | | G | 7 (2) (400 °C) | irbed or pro | oblematic. | Red Parent Ma Very Shallow D | aterial (TF2) Dark Surface in Remarks) | (TF12) |
| dicators strictive Type Dept | Stripped Matrix (S6) Dark Surface (S7) (L s of Hydrophytic veget e Layer (if observed :: th (inches): Wetland soils present | RR R, MLF ation and v | vetland hyd | rology mus | it be present | t, unless distu | | oblematic. | Red Parent Ma Very Shallow E Other (Explain | aterial (TF2) Dark Surface in Remarks) Yes | (TF12) |
| dicators strictive Type Dept | Stripped Matrix (S6) Dark Surface (S7) (L s of Hydrophytic veget e Layer (if observed :: th (inches): Wetland soils present | RR R, MLF ation and v | vetland hyd | rology mus | it be present | t, unless distu | | oblematic. | Red Parent Ma Very Shallow E Other (Explain | aterial (TF2) Dark Surface in Remarks) Yes | (TF12) |
| dicators strictive Type Dept | Stripped Matrix (S6) Dark Surface (S7) (L s of Hydrophytic veget e Layer (if observed :: th (inches): Wetland soils present | RR R, MLF ation and v | vetland hyd | rology mus | it be present | t, unless distu | | oblematic. | Red Parent Ma Very Shallow E Other (Explain | aterial (TF2) Dark Surface in Remarks) Yes | (TF12) |
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| dicators strictive Type Dept | Stripped Matrix (S6) Dark Surface (S7) (L s of Hydrophytic veget e Layer (if observed :: th (inches): Wetland soils present | RR R, MLF ation and v | vetland hyd | rology mus | it be present | t, unless distu | | oblematic. | Red Parent Ma Very Shallow E Other (Explain | aterial (TF2) Dark Surface in Remarks) Yes | (TF12) |
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WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region Project/Site: STH 59 West Bypass City/County: City and Town of Waukesha, Waukesha County Sampling Date: 09/08/2011 Applicant/Owner: Sampling Point: 63 Investigator(s): Donald M. Reed, PhD., SEWRPC Section, Township, Range: NW 1/4 Section 29, T7N, R19E Landform (hillslope, terrace, etc.): drainage way Local relief (concave, convex, none): concave Slope (%): 1-4% Lat: Long: Datum: Soil Map Unit Name: Lamartine silt loam (LmB) Spd NWI classification: none Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks) Are Vegetation____, SoilX, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ⊠ No 🗆 Are Vegetation____, Soil____, or Hydrology ____ naturally problematic? (If, needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. ⊠Yes □No Is the Sampled Area Hydrophytic Vegetation Present? within a Wetland? ⊠ Yes □No Hydric Soils Present? ⊠Yes □No Wetland Hydrology Present? ⊠Yes □No If yes, optional Wetland Site ID: PCA No. 32 Remarks: (Explain alternative procedures here or in a separate report.) Below normal precipitation for the past 90 days. Ditched waterway. **HYDROLOGY** Wetland Hydrology Indicators: Secondary Indicators (minimum of two required) Primary Indicators (minimum of one is required; check all that apply) ☐ Surface Soil Cracks (B6) Surface Water (A1) Drainage Patterns (B10) ☐ High Water Table (A2) Aquatic Fauna (B13) Moss Trim Lines (B16) ☐ Saturation (A3) ☐ Marl Deposits (B15) □ Dry-Season Water Table (C2) Water marks (B1) ☐ Hydrogen Sulfide Odor (C1) Crayfish Burrows (C8) Oxidized Rhizospheres on Living Roots (C3) ☐ Sediment Deposits (B2) ☐ Saturation Visible on Aerial Imagery (C9) □ Drift Deposits (B3) Presence of Reduced Iron (C4) Stunted or Stressed Plants (D1) Algal Mat or Crust (B4) Recent Iron Reduction in Tilled Soils (C6) \boxtimes Geomorphic Position (D2) Iron Deposits (B5) Thin Muck Surface (C7) Shallow Aquitard (D3) Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks) Microtopographic Relief (D4) Sparsely Vegetated Concave Surface (B8) Field Observations: Surface Water Present? Yes 🛛 No 🗌 Depth (inches): 15 Water Table Present? Yes No 🗌 Depth (inches): Saturation Present? Yes No 🗌 Depth (inches): _ Wetland Hydrology Present? Yes 🛛 No 🗌 (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks:

| VEGETATION | - Use scientific names of plants. |
|------------|-----------------------------------|
|------------|-----------------------------------|

Sampling Point: 63

| Tree Stratum (Plot size: 30' radius) | Absolute % Cover | Dominant Species? | Indicator Status | Dominance Test worksheet: |
|--|---------------------|----------------------|---------------------|--|
| 1 | 70 00101 | | | Number of Dominant Species |
| 2 | 2-1-00 | | 4 5 | That are OBL, FACW, or FAC: 2 (A) |
| 3 | V | | | Total Number of Dominant |
| | S 18 | | | Species Across All Strata: 2 (B) |
| 4 | | | _ | |
| 5 | - | | - V | Percent of Dominant Species |
| 6 | | | | That Are OBL, FACW, or FAC: 100 (A/B) |
| 7 | | | | Prevalence Index worksheet: |
| () | <u>O</u> | = Total Cove | er | Total % Cover of: Multiply by: |
| Sapling/Shrub Stratum (Plot size: 30' radius) | | | | OBL species x 1 = |
| 1 | | | | FACW species x 2 = |
| | | | | |
| 2 | | | | FAC species x 3 = |
| 3 | | | | FACU species x 4 = |
| 4 | - | | | UPL species x 5 = |
| 5 | | П | | Column Totals: (A) (B) |
| 6 | | \Box | | Prevalence Index = B/A = |
| 7 | | . П | | Hydrophytic Vegetation Indicators: |
| | <u>o</u> | = Total Cove | er | Rapid Test for Hydrophytic Vegetation |
| Herb Stratum (Plot size: 5' radius) | | 12101 274 | | |
| Phalaris arundinacea | 80 | \boxtimes | FACW | ☐ Morphological Adaptations¹ (Provide supporting |
| | | | | data in Remarks or on a separate sheet) |
| 2. Typha latifolia | 20 | | OBL | ☐ Problematic Hydrophytic Vegetation¹ (Explain) |
| 3 | | П | | ¹ Indicators of hydric soil and wetland hydrology must |
| 4 | - | | | Be present, unless disturbed or problematic. |
| 5 | 7 2 | | | |
| 6 | | | A 200-A70-W | Definitions of Vegetation Strata: |
| 7 | | | | T W(tlt2)- (7.0) l Ilt |
| | | | _ | Tree – Woody plants 3in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height |
| 8 | | | - | at broadt Holgin (DBH), regardless of Holgin |
| 9 | | | - | Sapling/shrub – Woody plants less than 3in. DBH |
| 10 | | | | and greater than 3.28 ft (1 m) tall. |
| 11 | 2 3 | | | Herb – All herbaceous (non-woody) plants, regardless |
| 12 | | | | of size, and woody plants less than 3.28 ft tall. |
| 17.7 | 100 | = Total Cove | er | |
| Woody Vine Stratum (Plot size: 30' radius) | | | | Woody vines – All woody vines greater than 3.28 ft in |
| | 9 | | | height |
| 1 | | | | |
| 2 | | | | |
| 3 | - | | <u> </u> | Hydrophytic |
| 4 | | | · | Vegetation |
| | <u>O</u> | = Total Cove | er | Present? Yes ⊠ No □ |
| Remarks: (include photo number here or on a separate sheet | .) Fresh (wet |) meadow. Pho | to 68 | |
| | | | | 3. a |
| 1) | | | | |
| 9 | | | | |
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| Depth . | Matrix | | | Redox Feature | | | | | |
|------------|---------------------------------|-----------------|----------------|--------------------|----------------------|---------------|--|---------------|--------------|
| inches) | Color (moist) | % · C | Color (moist) | % | Type¹ L | .oc² | Texture | Rema | rks |
| | | W | | | | | | | |
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| pe: C=C | oncentration, D=Depl | etion, RM=Redu | iced Matrix | CS=Covered or C | pated Sand G | rains | ² Location: PL=Pore I | ining M=Matri | ν. |
| | Indicators: | odon, raw rada | Jood Widdix, | oo oovered or o | Jatoa Garia Gi | | ndicators for Problema | | |
| | listosol (A1) | | | Polyvalue Below S | urface (S8) (L | | 2 cm Muck (A10) | | |
| | listic Epipedon (A2) | | | MLRA 149B) | | 20 | ☐ Coast Prairie Red | | |
| | lack Histic (A3) | | | Thin Dark Surface | (S9) (LRR R, | MLRA 149B) | | | |
| □ H | lydrogen Sulfide (A4) | | | oamy Mucky Min | | | ☐ Dark Surface (S7 | | |
| | tratified Layers (A5) | | □ L | oamy Gleyed Ma | trix (F2) | | ☐ Polyvalue Below : | | |
| | epleted Below Dark S | | | Depleted Matrix (F | | | ☐ Thin Dark Surface | | |
| | hick Dark Surface (A | | | Redox Dark Surfac | | | ☐ Iron-Manganese I | | |
| | andy Mucky Mineral (| | | Depleted Dark Sur | | | Piedmont Floodpl | | |
| | andy Gleyed Matrix (| S4) | □ F | Redox Depression | s (F8) | | ☐ Mesic Spodic (TA | | A, 145, 149E |
| | andy Redox (S5) | | | | | | Red Parent Mater | | |
| | tripped Matrix (S6) | D.D. MII DA 446 | \ | | | | ☐ Very Shallow Dar | | 2) |
| | ark Surface (S7) (LR | R R, WILRA 149 | ,6) | | | | Other (Explain in | Remarks) | |
| dicators o | of Hydrophytic vegetat | ion and wetland | l hydrology m | oust he present u | aless disturbed | d or problema | tic | | |
| | Layer (if observed): | | riyarology ii | rast be present, a | ness disturbed | T Or problema | uo. | | |
| Type: | 하기 있다. 전에는 하게 보고 하다면 하늘 어디에 다래? | | | | | 8 | Hydric Soil Present? | Yes ⊠ N | lo 🗆 |
| | (inches): | | | | . 3 | | riyano oon riesenti | 163 🖂 | •• 🗆 |
| | oils inundated with 15 | of water, hydri | c by definitio | n - Criteria 3. | 10.00 | | | | |
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Photo 7: Sample point 7



Photo 8: Sample point 8



Photo 9: Sample point 9



Photo 10: Sample point 10



Photo 11: Sample point 11



Photo 12: Sample point 12



Photo 13: Sample point 13



Photo 15: Sample point 15

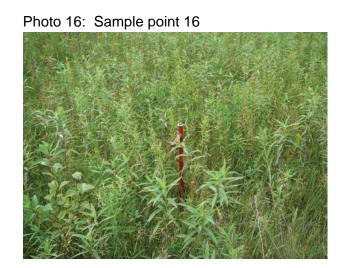


Photo 17: Sample point 17



Photo 19: Sample point 18



Photo 20: Sample point 19

Photo 21: Sample point 20



Photo 22: Sample point 21



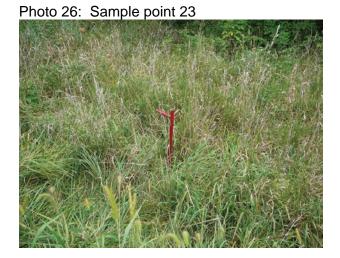
Photo 23: Sample point 22 shallow roots

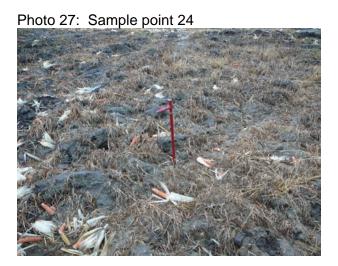


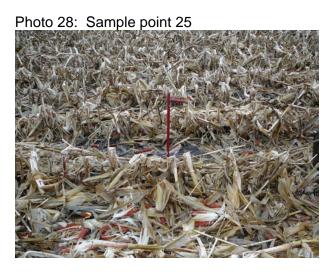
Photo 24: Sample point 22 shallow roots



Photo 25: Sample point 22







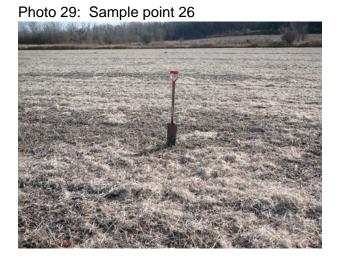




Photo 31: Sample point 28



Photo 32: Sample point 29



Photo 33: Sample point 30



Photo 34: Sample point 31



Photo 35: Sample point 32



Photo 36: Sample point 33



Photo 37: Sample point 34



Photo 38: Sample point 35



Photo 39: Sample point 36



Photo 40: Sample point 37



Photo 41: Sample point 38



Photo 42: Sample point 39



Photo 43: Sample point 40





Photo 45: Sample point 42



Photo 46: Sample point 43



Photo 47: Sample point 44



Photo 48: Sample point 45



Photo 49: Sample point 46



Photo 50: Sample point 47



Photo 51: Sample point 48



Photo 52: Sample point 49



Photo 53: Sample point 50



Photo 54: Sample point 51



Photo 55: Sample point 52



Photo 56: Sample point 53



Photo 57: Sample point 54



Photo 58: Sample point 55



Photo 59: Sample point 56



Photo 60: Sample point 57 algae crust

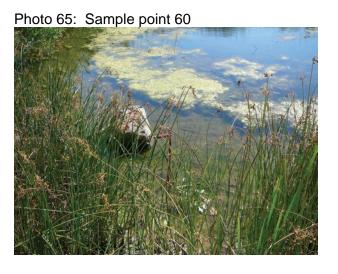


Photo 61: Sample point 57 algae crust









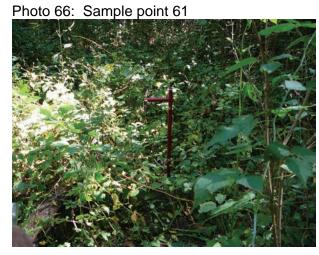


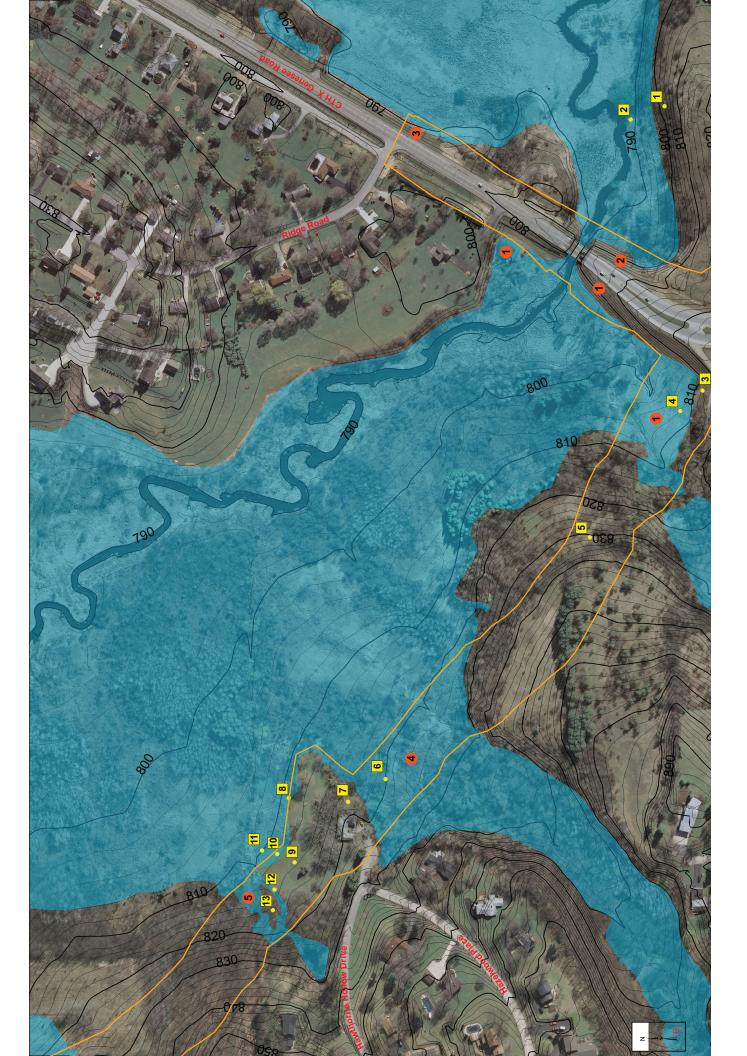
Photo 67: Sample point 62

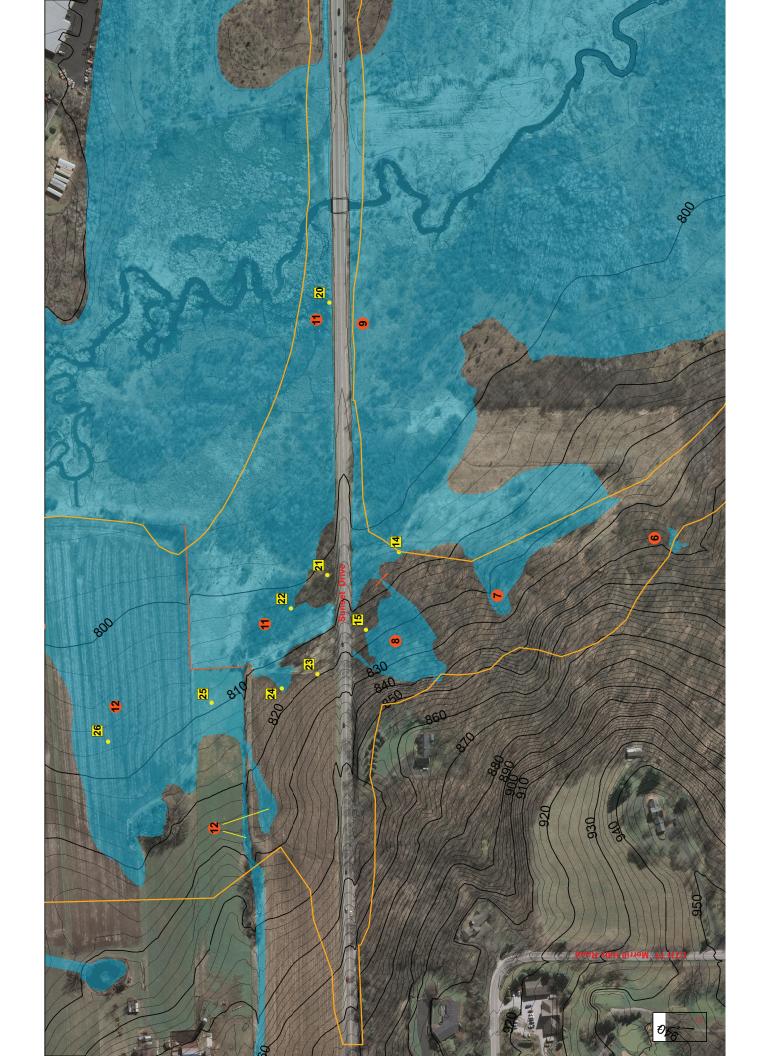


Photo 68: Sample point 63

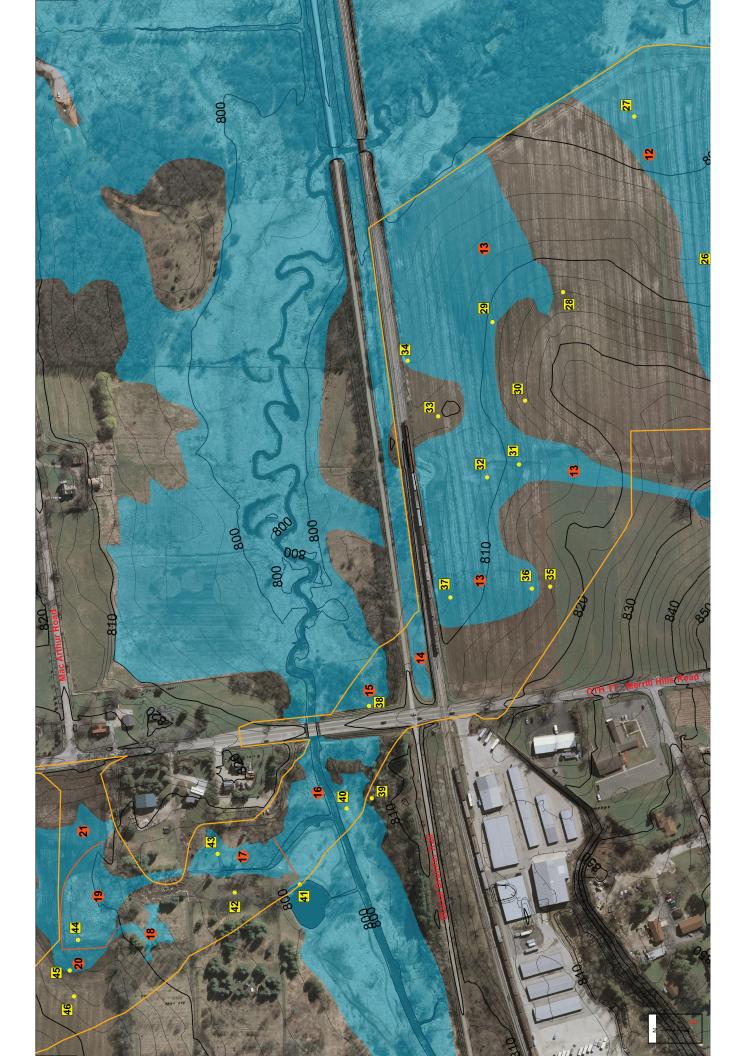


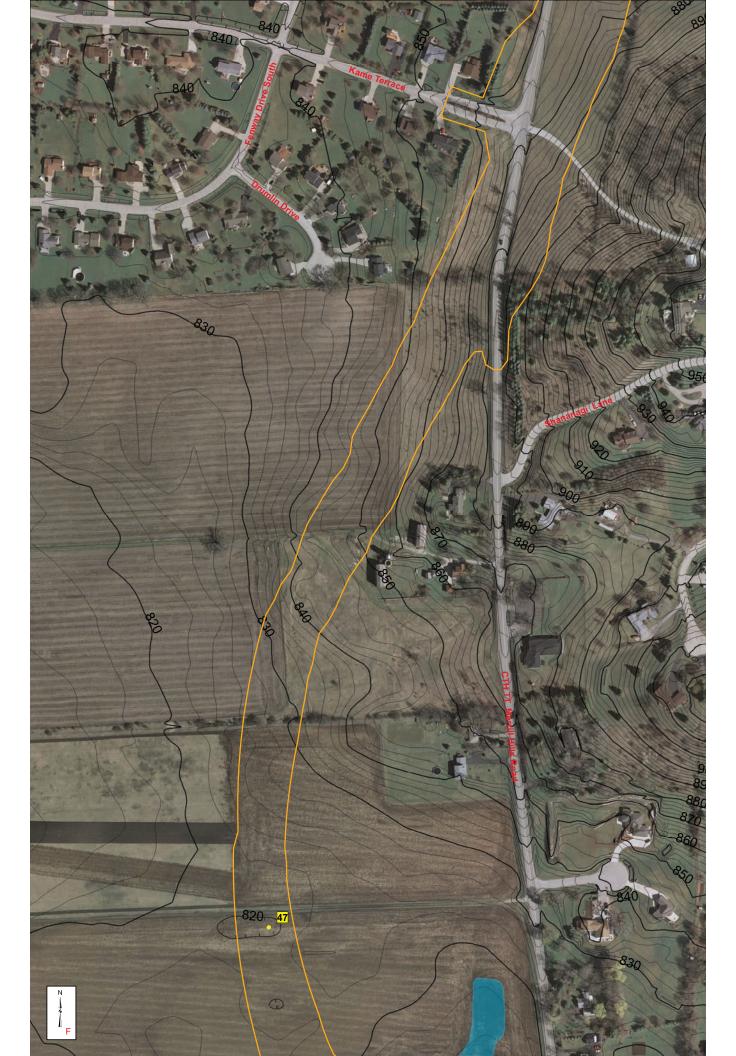


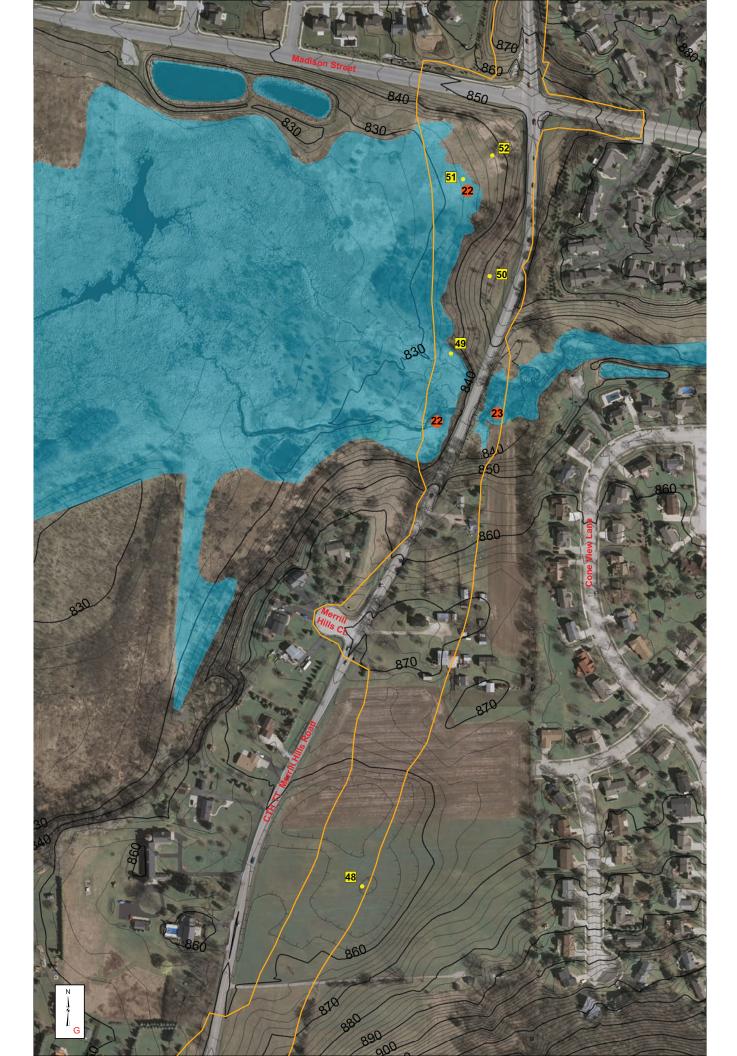




















Subsurface Exploration and Geotechnical Evaluation, Summit Road to Genesee Road Alternative Alignments—Waukesha West Bypass

PREPARED FOR: Waukesha County

PREPARED BY: Charles J. Winter, P.E./CH2M HILL

DATE: August 26, 2011, revised January 9, 2012

PROJECT NUMBER: 401308.WB.DE.03

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Attachments

A. Figures

- 1. Site Location Diagram
- 2. Plan Alignment and Profile Pebble Creek West Alternative
- 3. Soil Boring Location Diagram
- B. Drilling Procedures and Boring Logs

General Drilling Notes and Soil Classification System

Boring Logs 2011-01 through 2011-11

C. Laboratory Test Results

Laboratory Test Results

Introduction and Purpose

Waukesha County is considering three alternatives for the proposed west Waukesha bypass between Sunset Drive and State Highway 59 in Waukesha County, Wisconsin. The site location is provided in Figure 1 of Attachment A.

One alignment, termed "Pebble Creek Mapped Route" (PCMR), was originally proposed to approximately parallel Pebble Creek, offset approximately 300 to 500 feet to the west. This alignment, while still under consideration at the time of the subsurface exploration, has since been abandoned. However, subsurface conditions and recommendations for this alignment are contained in this technical memorandum in the event this alignment is reconsidered.

A second alignment, termed "Pebble Creek West" alternative (PCW), proposes extending a roadway through a combination of uplands and lowlands through the Pebble Creek area, approximately 200 to 400 feet west of the Pebble Creek Mapped Route. The plan alignment and tentative elevation profile are provided in Figure 2 of Attachment A. Subsurface exploration detailed herein was executed to evaluate the feasibility of this alignment.

A third alignment, termed "Sunset Drive to County X" is also being considered; this alternative avoids roadway construction through the Pebble Creek area and therefore is not addressed in this technical memorandum.

The purpose of this technical memorandum is to evaluate the subsurface conditions along both the Pebble Creek Mapped Alignment and the Pebble Creek West Alternative for support of embankments and roadway pavement. Construction consideration issues are also presented.

2. Subsurface Exploration and Laboratory Testing Programs

2.1 Subsurface Exploration Program

Eleven soil borings (denoted 2011-01 through 2011-11) were located and drilled by CH2M HILL based on the area proposed for both the Pebble Creek West Alternative and the Pebble Creek Mapped Route alignments. The locations were reviewed with the Wisconsin Department of Natural Resources (WDNR) staff to avoid areas deemed to have considerable ecological significance, and were done during the winter season to minimize impact to vegetation. Borings 2011-01 through 2011-07 were located to evaluate various portions of the Pebble Creek Mapped Route; Borings 2011-08 through 2011-11 were selected to evaluate various portions of the Pebble Creek West Alternative. The borings were staked and ground surface elevations measured using survey methods by Kapur and Associates, Inc. (Kapur) of Milwaukee, Wisconsin. All borings were drilled on-location, therefore no subsequent "asdrilled" survey was warranted. The elevation, depth, and termination elevations are presented in Table 1.

TABLE 1
Summary of Soil Borings Drilled for Pebble Creek Alternatives

| Soil Boring | Alignment | Ground Surface Elevation | Boring Depth, feet | Boring Termination Elevation |
|----------------|-----------|-----------------------------|-----------------------|---------------------------------|
| 2011-01 | PCMR | 799.6 | 15 | 784.6 |
| 2011-02 | PCMR | 800.2 | 15 | 785.2 |
| 2011-03 | PCMR | 799.9 | 15 | 784.9 |
| 2011-04 | PCMR | 797.4 | 15 | 782.4 |
| 2011-05 | PCMR | 798.3 | 15 | 783.3 |
| 2011-06 | PCMR | 812.0 | 15 | 797.0 |
| 2011-07 | PCMR | 800.6 | 15 | 785.6 |
| 2011-08 | PCW | 821.9 | 15 | 806.9 |
| 2011-09 | PCW | 809.0 | 15 | 794.0 |
| 2011-10 | PCW | 849.6 | 15 | 834.6 |
| 2011-11 | PCW | 823.0 | 15 | 808.0 |

PCMR = Pebble Creek Mapped Route

PCW = Pebble Creek West

Boring locations are depicted on the Soil Boring Location Diagram in Figure 3 of Attachment A, and borehole coordinates are presented on the respective boring log in Attachment B.

The borings were drilled by GESTRA Engineering, Inc. (GESTRA) between February 23 and February 25, 2011. The borings were advanced using an ATV-mounted rotary drill rig. The borings were advanced using hollow-stem augers.

Sampling was performed at approximate 2.5-foot intervals. Most samples were obtained by driving a split-spoon (SS) sampler during Standard Penetration Tests (SPT), in general accordance with ASTM D1586. A limited number of thin-walled (Shelby Tube) "ST" samples were also obtained, in general accordance with ASTM D1587.

The driller maintained a field log that described sample recovery, and also documented sample intervals, field test data, and observations of drilling resistance, groundwater occurrence, and other pertinent conditions. Representative portions of recovered samples were subsequently containerized, sealed, labeled, and then transported to the laboratory for further examination and testing. All borings were backfilled with bentonite upon completion, in accordance with Wisconsin Department of Natural Resources (WNDR) requirements. General drilling notes are contained in Attachment B.

2.2 Laboratory Testing Program

A laboratory testing program was undertaken after drilling completion. The program included visual sample examination and classification testing. Each SS sample was visually

examined by a geotechnical engineer who estimated the distribution of grain sizes, plasticity, consistency, moisture condition, color, presence of lenses and seams, and apparent geologic origin. The soils were classified in general accordance with ASTM D2488 "Standard Practice for Description and Identification of Soils." A chart describing this classification system is included in Attachment B.

After visual classification, laboratory testing was performed on selected samples. Table 2 provides a summary of the testing performed, the ASTM standard followed, and the results of the testing. The visual soil classifications were compared with results of the Atterberg limits, and particle size distribution tests and appropriate changes made to the boring logs.

TABLE 2 Laboratory Tests Performed

| Laboratory Test | ASTM Designation | Number of Tests | Range of Results |
|--|-------------------------|-----------------|--|
| Water Content | ASTM D2216 | 51 | 8 to 432% |
| Loss-on-Ignition (LOI) (Organic Content) | ASTM T297 | 11 | LOI = 2 to 68% |
| Particle Size Distribution | ASTM D422 | 3 | Refer to lab results |
| Unconfined Compression | ASTM D2166 | 5 | 0.5 to 1.0 tsf ^A |
| Unit Weight | ASTM D4318 | 5 | Dry = 91 to 114 pcf ^A , Moist = 132 to 138 pcf |

A tsf = tons per square foot, pcf = pounds per cubic foot

Results of laboratory testing are presented in Attachment C.

3. Site Information

3.1 Topographic Information

The existing ground surface along the alignment of the Pebble Creek Mapped Route is generally flat, with ground surface elevations ranging from 796 to 804. The existing ground surface along the alignment of the Pebble Creek West Alignment has considerably more relief, with ground surface elevations ranging from 806 to 844.

3.2 Existing Subsurface Information

Existing subsurface information for the Pebble Creek corridor was reviewed from the following sources:

- 1 Pebble Creek Ground Water Monitoring and Surface Water Screening Waukesha Bypass Corridor, prepared for Waukesha County / CH2M HILL by GRAEF, 2010.
- 2 Ground Water Resources of Southern Wisconsin; South Eastern Wisconsin Regional Planning Commission (SEWRPC), 2002.
- 3 Ground-Water Resources of Waukesha County, Wisconsin; United States Geological Survey Information Circular Number 29, 1975.

4 Soil Survey of Milwaukee and Waukesha Counties, Wisconsin; United States Department of Agriculture, 1971.

The above information primarily concentrated on the groundwater / infiltration properties of the existing site soils and existing vegetation. Soil samples taken in the GRAEF (2010) report and in the USDA Soil Survey (1971) were primarily taken from the upper five feet utilizing hand augers, while the other references provide regional information. The information, while useful from a qualitative perspective, does not provide engineering data from which to make a structural evaluation regarding the appropriateness of the site soils to support embankment and roadway loads.

3.3 Regional Geology

The valley in which Pebble Creek runs is situated between highlands to the east and west. The soils within the valley are mostly post-glacial alluvial and estuarine deposits, while the soils comprising the uplands are predominantly glacial, consisting predominantly of till soils comprising what is likely a drumlin glacial formation. Glacial soil deposits were reported by the SEWRPC report (2002) as having thickness ranging from 50 to 150 feet.

A more-detailed description of the geological history of the site is contained in the GRAEF (2010) project report.

3.4 Soil Survey Information

The surfical soils along both the Pebble Creek Mapped Route and the Pebble Creek West alignments between Sunset and Genesee Roads were classified through the USDA soil survey (1971). The soils underlying the Pebble Creek Mapped Route were classified within the following soil series: Sebewa silt loam (Sm), Houghton muck (HtB), Brookston silt loam (BsA), and Lamertine silt loam (LmB).

The soils underlying the Pebble Creek West alignment were classified within the following soil series: Brookston silt loam (BsA), Wallkill silt loam (Wa), Lamertine silt loam (LmB), Pistakee silt loam (PrA), and Hochheim loam (HmC2).

With the exception of the Houghton muck, these soil units are typically described as comprised of fine-grained soils, namely silt and clay. Houghton muck is described as containing predominantly peat and other high-organic soil.

The soils encountered in the upper five feet of the borings drilled for this exploration generally agree with the soil units previously identified. Exceptions to this were the upper few feet of Borings 2011-01, 2011-05, and 2011-06, where the borings encountered significant peat and/or highly organic clay soil deposits.

It should be emphasized that the soil survey is conducted primarily to address vegetation, infiltration, and drainage issues and is not designed to serve geotechnical applications. Therefore, we recommend that pavement, earthwork, and structural designs be predicated on the boring logs contained in this report and on future geotechnical borings.

3.5 Soil and Groundwater Conditions Encountered During Exploration

3.5.1 Pebble Creek Mapped Route

The borings drilled along the Pebble Creek Mapped Route (borings 2011-01 through 2011-07) encountered organic surfical soils (likely post-glacial alluvial and/or estuarine

deposits) overlying alternating layers of granular, fine-grained non-cohesive, and fine-grained cohesive deposits. The underlying deposits are likely glacial in origin, consisting of glacial fine-grained till units with seams and layers of coarser-grained outwash deposits.

The surfical soils, extending to depths ranging from 2 to 5 feet, included considerable organic matter, with loss-on-ignition (organic content) values ranging from 2.1 to 65 percent, and water contents ranging from 31 to 432 percent. The higher organic content and higher water content values were from peaty soils encountered in borings 2011-01, 2011-06, and 2011-07. Unconfined compressive strengths of cohesive portions of these soils ranged from less than 0.25 tons per square foot (tsf) to 1.0 tsf. These soils are weak, highly compressible, and easily disturbed. These soils are typically not considered suitable for support of embankments and/or pavements in their present state.

Soils underlying the surfical soils described above consisted of a relatively thin layer of clay over alternating layers of granular and cohesive soils. The upper clay soil, which typically extended to a depth of 5 feet, had unconfined compressive strengths on the order of 0.5 to 1.5 tsf, with water contents ranging from 15 to 30 percent. These soils have low to moderate strength, are moderately compressible, and are easily disturbed. These soils will be of adequate strength to support embankments and/or pavements. Given the easily disturbed nature of these soils, careful construction methods will need to be employed to minimize disturbance to these soils.

The underlying cohesive soil layers typically had the composition of lean clay, with strengths ranging from 0.75 to 3.0 tsf, with water contents ranging from 8 to 25 percent. The underlying non-cohesive soils, comprised of silt, sandy silt, silty sand, or fine-to-coarse sand, had relative densities ranging from loose to dense. All of these underlying soils have moderate to high strength, and have low to moderate compressibility. These soils are suitable for structural support of an embankment and roadway, although the finer-grained soils, especially the weaker lean clay and the silt, will be highly prone to disturbance and therefore will need careful construction methods to minimize disturbance to the subgrade.

Groundwater was encountered in each boring drilled along the Pebble Creek Mapped Route, at depths ranging between zero (i.e., surface) and 10 feet (corresponding to elevations between 788.3 and 812.0). Given the close areal and vertical proximity to Pebble Creek, it is likely that the groundwater table is very shallow, likely slightly higher than Pebble Creek. The granular soils encountered at shallow depths are likely hydraulically connected with Pebble Creek.

3.5.2 Pebble Creek West Alternative

The borings drilled along the Pebble Creek West alternative alignment (Borings 2011-08 through 2011-11) encountered predominantly clayey soils at the surface underlain with a variety of fine-grained and coarse-grained soils. All of the soils are likely of glacial origin.

The surfical clayey soils typically consisted of a thin layer of clayey topsoil underlain with lean clay and silty clay. These soils extended to depths ranging from 5 to 10 feet. The clays had unconfined compressive strengths ranging from 0.25 to 1.0 tsf, with the weaker soils typically at the surface. Water contents ranged from 13 to 35 percent, with the higher values present near the surface. With the exception of the surfical topsoil layer, these soils should have adequate strength to support an embankment and/or roadway, and have low to

moderate compressibility. These soils' susceptibility to disturbance will be largely dependent on the location of the groundwater table; soils significantly above the groundwater table will be considerably less susceptible to disturbance than soils marginally above or below the groundwater table.

The underlying soils were stratified into layers comprised of clayey sand, fine sand, silty sand, gravel, silty clay and lean clay. The granular portions of these materials had relative densities in the loose to dense range, with densities typically increasing with depth. The cohesive portions had unconfined compressive strengths ranging from 1.0 to 3.25 tsf, and water contents ranging from 9 to 20 percent. These soils should have adequate strength to support an embankment and/or roadway, and have low to moderate compressibility. These soils' susceptibility to disturbance will be largely dependent on the location of the groundwater table; soils significantly above the groundwater table will be considerably less susceptible to disturbance than soils marginally above or below the groundwater table.

Groundwater was encountered during drilling at depths ranging from 6.5 to 10 feet (corresponding to elevations between 799 and 816.5), with the exception of Boring 2011-10, which did not encounter groundwater at the termination depth of 15 feet (Elevation 834.6). It should be noted that the occurrence of groundwater within these borings may represent the location of saturated granular soil layers and may not be necessarily indicative of the groundwater table. Also, given the location of these borings on the side of a significant hill, the occurrence of groundwater may be indicative of a perched condition (where groundwater is ponded on top of a low-permeability clay layer) and not indicative of the groundwater table.

4. Recommendations

4.1 Pebble Creek Mapped Route

The soils encountered from the ground surface to a typical depth of 5 feet in the borings drilled along the Pebble Creek Mapped Route are generally not suitable for support of either embankment or roadway in their present condition. These soils will likely need to be removed during construction and replaced with suitable fill material. When these soils are removed, it will be difficult to establish and maintain a stable subgrade on which to properly place and compact fill material. A separation material, such as a non-woven geotextile, will need to be placed at the bottom of the overexcavation to minimize the migration of the structural fill into the weaker subgrade soil. The "suitable" subgrade soils (as described in the Soils and Groundwater discussion above) are highly prone to construction disturbance, and therefore construction will need to be coordinated so that only a small area is exposed at a time (i.e., avoid mass excavation). This will result in higher-than-typical construction costs. In addition, the close proximity to Pebble Creek and the likely hydraulic connectivity between the soils along the alignment and the creek will make it difficult to dewater these soils to create the overexcavation.

Depending on the construction schedule and the proposed roadway grade, it may be possible to adequately improve the poor soils in-situ by means of a surcharge program. A surcharge program involves temporarily placing a large amount of fill (likely more fill than would otherwise be required for the finished embankment) and letting the compressible soils equilibrate (i.e., settle) under the imposed load. The operation could be configured to

be a "rolling surcharge" where the same surcharge material is advanced along the alignment, hence minimizing the amount of surcharge material needed¹.

The surcharge material would likely need to be in place (at any given location) for a time ranging between one week to perhaps over a month, depending on the surcharge load and the soil types being compressed¹. Survey points will need to be established (and periodically monitored) to evaluate the amount of settlement and incremental trends. After the soils have exhibited sufficient settlement, the surcharge is removed and the embankment and pavement constructed. There is a risk that, even with the surcharge program, higher-than-typical settlements may still be incurred post-construction, thus decreasing pavement life and increasing maintenance costs.

The above evaluation was made based on a limited number of borings, is intended to be conceptual, and should be followed with a more-extensive exploration and engineering analyses should the Pebble Creek Mapped Route alignment be re-considered.

4.2 Pebble Creek West Alternative

The Pebble Creek West alternative will skirt the existing bluff to the west of Pebble Creek. Given the sloping ground topography, a considerable amount of earthwork will be required to facilitate a roadway. Given the preliminary roadway profile (Figure 2 Attachment A), cuts on the order of 9 feet and fills on the order of 20 feet will be required.

With a few exceptions, the soils appear to be favorable for support of roadway embankment and/or direct support of a pavement section. The notable exceptions would be the upper two to three feet of 2011-09, which encountered a peat seam at a depth of two feet (elevation 807), and topsoil/organic material encountered in the upper two feet of 2011-11. Similar thin removals may also be incurred at other places along the alignment, especially in the lowerlying areas.

We anticipate that, unlike the Pebble Creek Mapped Alignment, groundwater issues will not be a significant concern. Excavations made to remove soils described in the previous paragraph should not encounter the groundwater table. Proposed cut excavations may encounter saturated granular soils; however groundwater from these soils should drain relatively quickly.

Limitations

This technical memorandum was prepared for Waukesha County for the specific project and use discussed herein. The specific project details are unique relative to the proposed vertical and horizontal alignments. The recommendations presented herein are preliminary, and additional exploration and analyses are necessary for design of any of the roadway alternatives. If project information presented in this report changes, such changes should be reviewed by the Engineer and other design professional working on this project to confirm that these are correct for the planned use and project. It may be necessary to modify this

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¹ It should be noted that since roadway profiles were not developed for the Pebble Creek Mapped Route, it was not possible to further quantify the amount of surcharge required, nor provide a refined estimate of the time period required to adequately surcharge the area. Such estimates can be developed if vertical roadway grades and lateral fill extent are developed for this alignment.

memorandum, its conclusions, and recommendations. The accuracy and completeness of any documents or information provided by others as to project specifics or prior property uses have been reasonably relied on by CH2M HILL geotechnical engineers in performing this evaluation and providing recommendations.

The analyses, conclusions, and recommendations in this memorandum are based on the subsurface conditions present in the test borings and the engineering characteristics of the soils as determined through field and laboratory testing at this point in time, as defined in the current work scope. Subsurface conditions can change over time due to both natural and man-made forces, including changes in condition or use of adjacent properties.

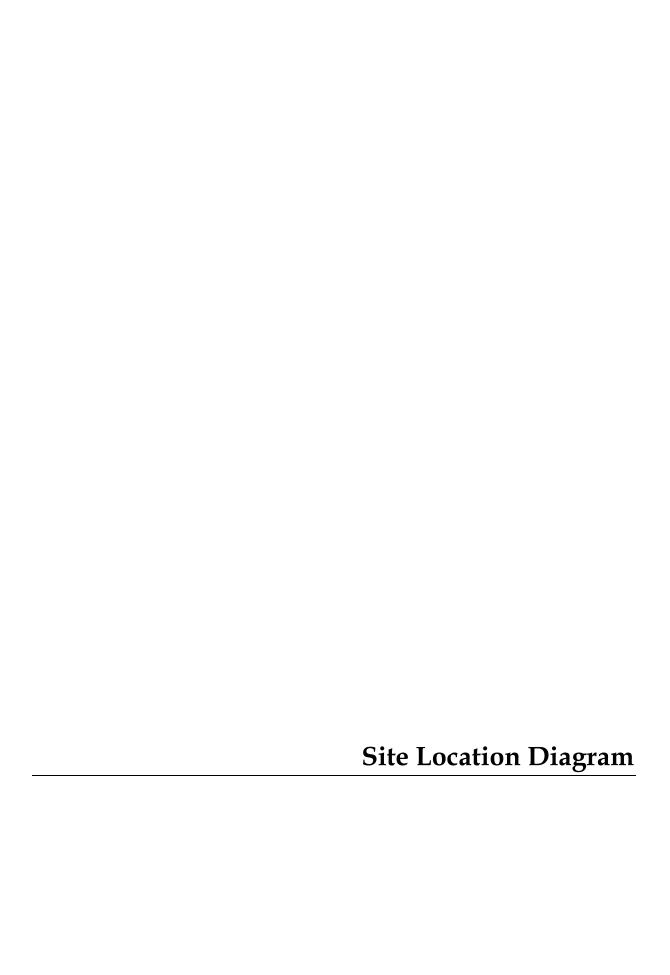
The memorandum does not reflect variations in subsurface conditions that may exist between or beyond these borings. Variations in soil conditions should be expected between the borings, the nature and extent of which may not become evident until construction is undertaken. The construction is recommended to be observed and tested by the geotechnical engineer or representative to determine if the subsurface conditions are as indicated by the borings and perform as anticipated.

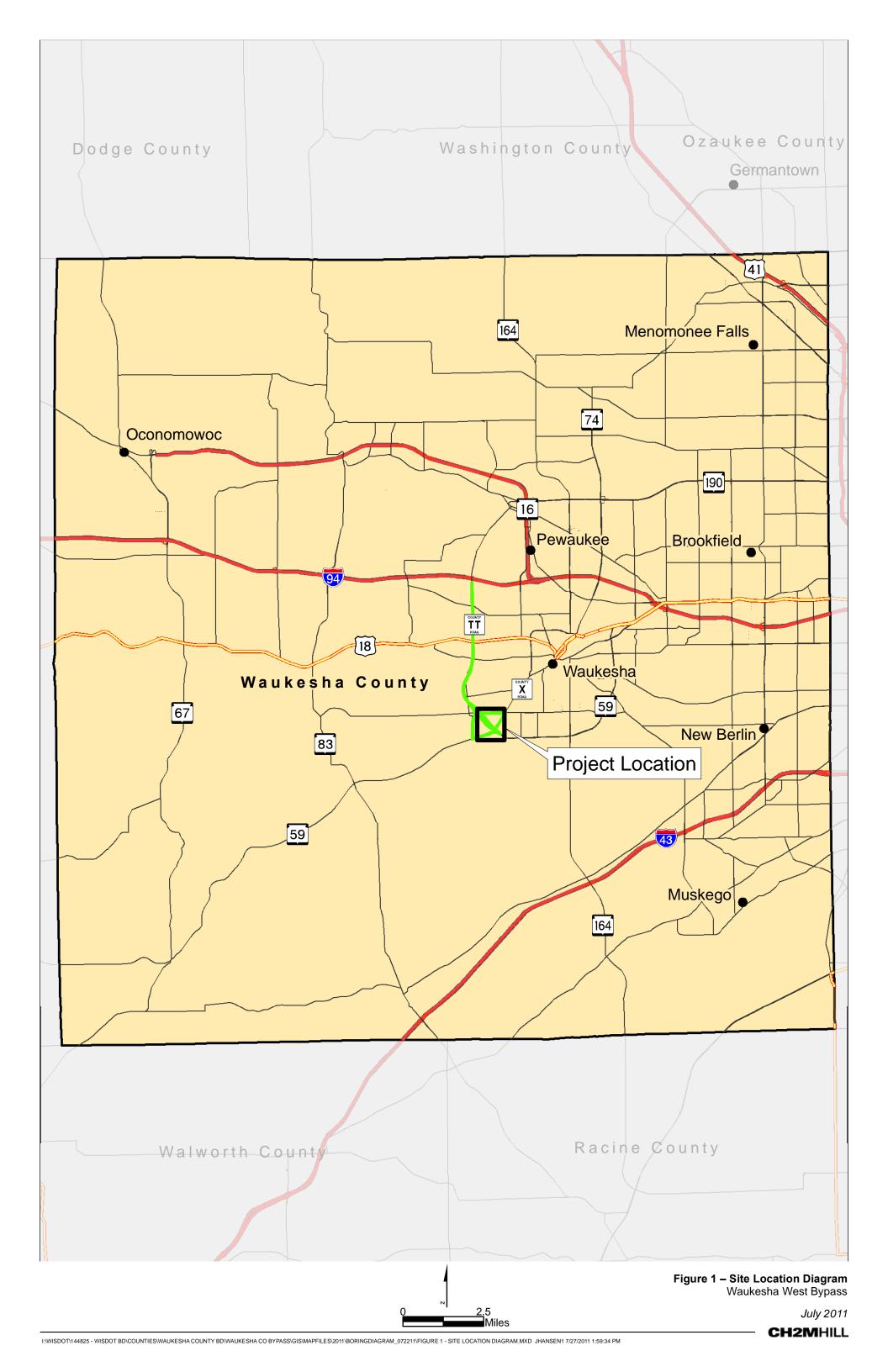
If the conditions encountered during construction are different from those inferred by the test borings or the project details and information changes, the geotechnical engineer must be contacted to determine if modification to the recommendations presented in this memorandum are required. The recommendations presented in this memorandum are related and are not mutually exclusive of each other. Therefore, no single portion of the memorandum should be removed or be considered as a stand-alone recommendation. Boring logs must also remain with the memorandum, as they are not to be interpreted on their own.

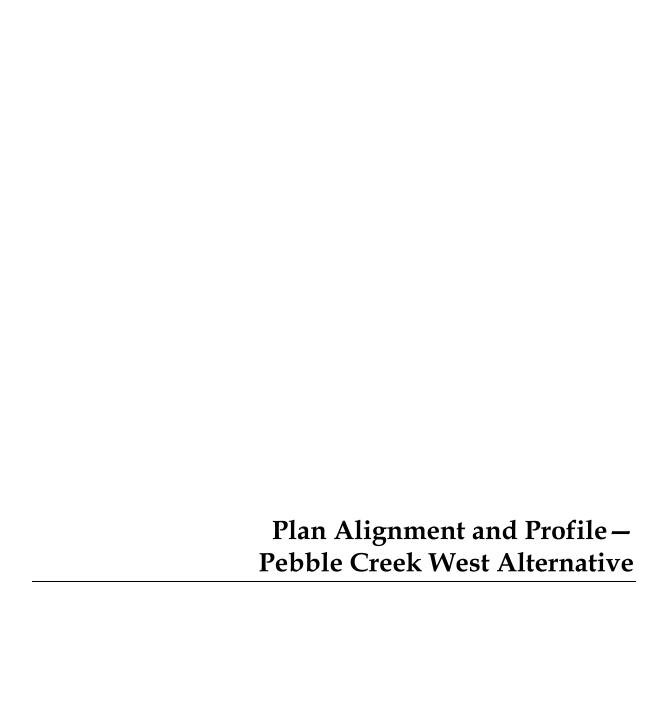
The geotechnical engineering recommendations presented herein are an evaluation of subsoil performance based on the geotechnical engineer's experience and professional opinion. These services were performed with the degree of skill and care normally utilized by other members of the geotechnical engineering profession practicing in this location at this time. No warranty is either expressed or implied.

This memorandum is intended for geotechnical design purposes only and does not document the presence or absence of any environmental impacts at the site. Environmental services were specifically beyond the authorized scope of services covered herein.

Attachment A Figures







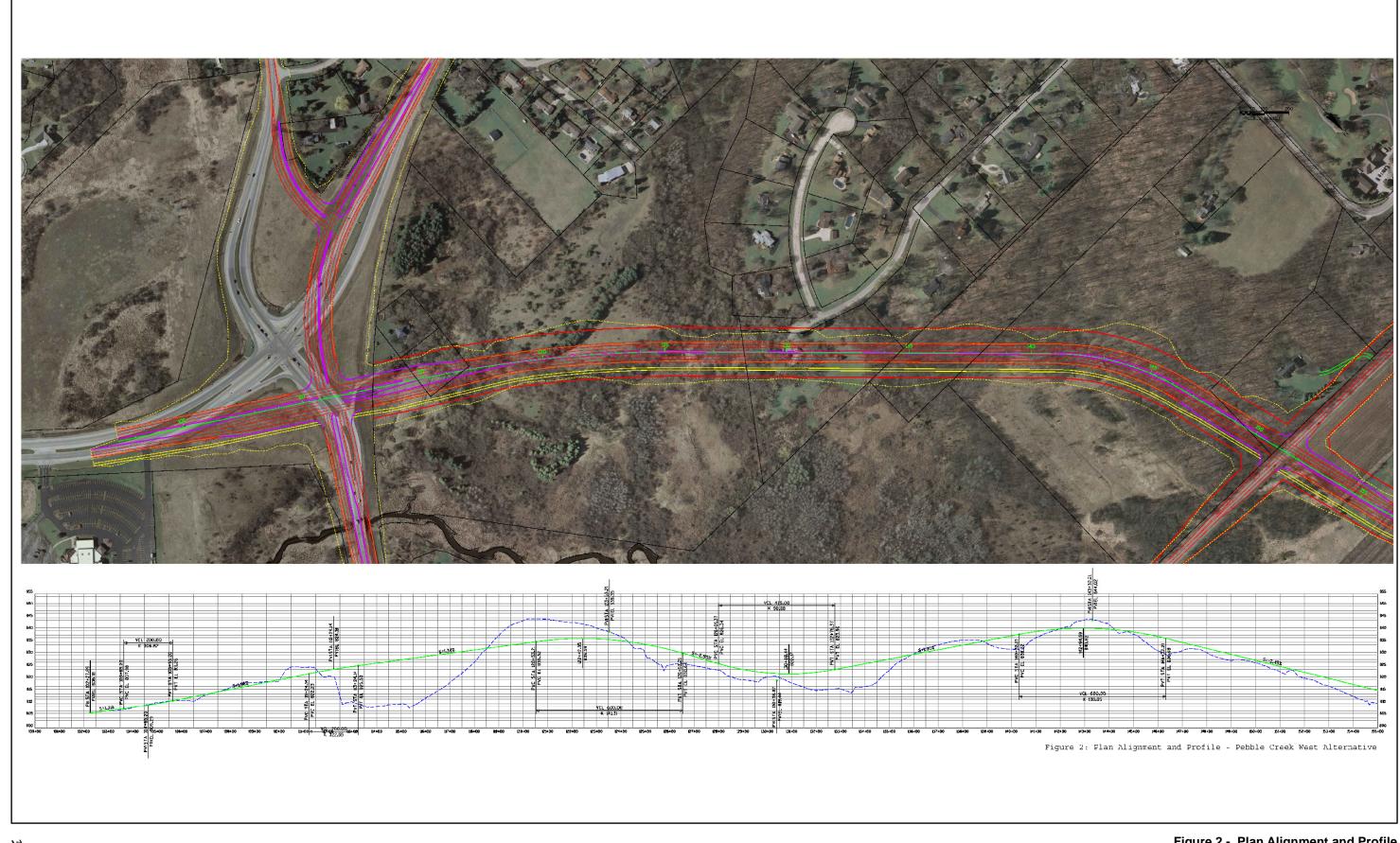
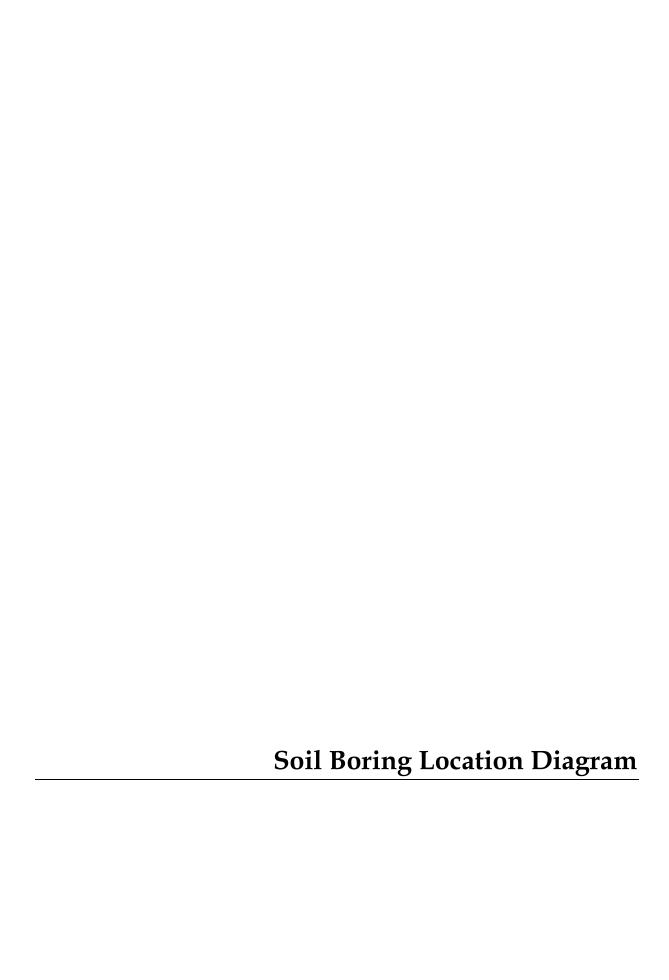
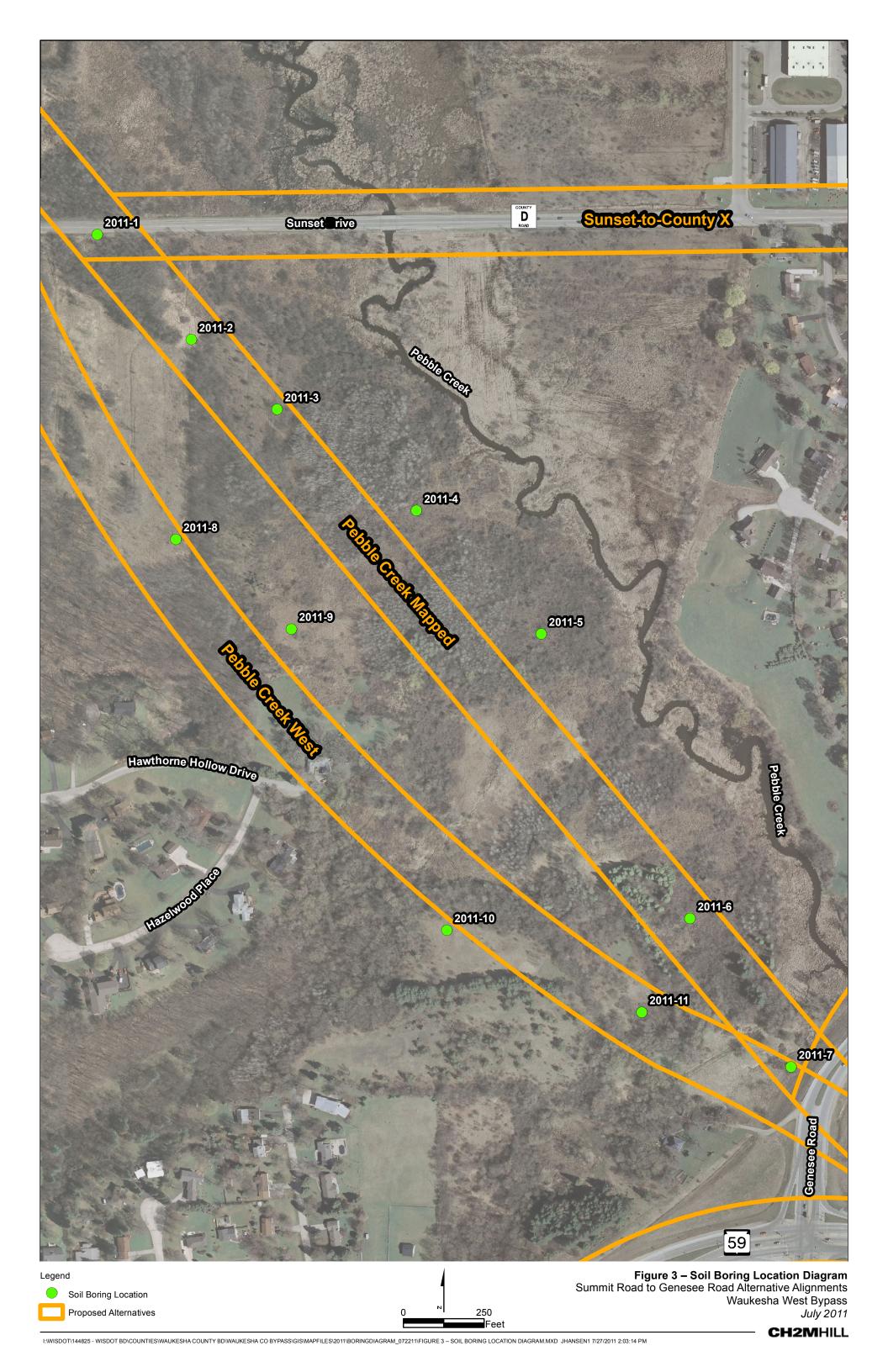
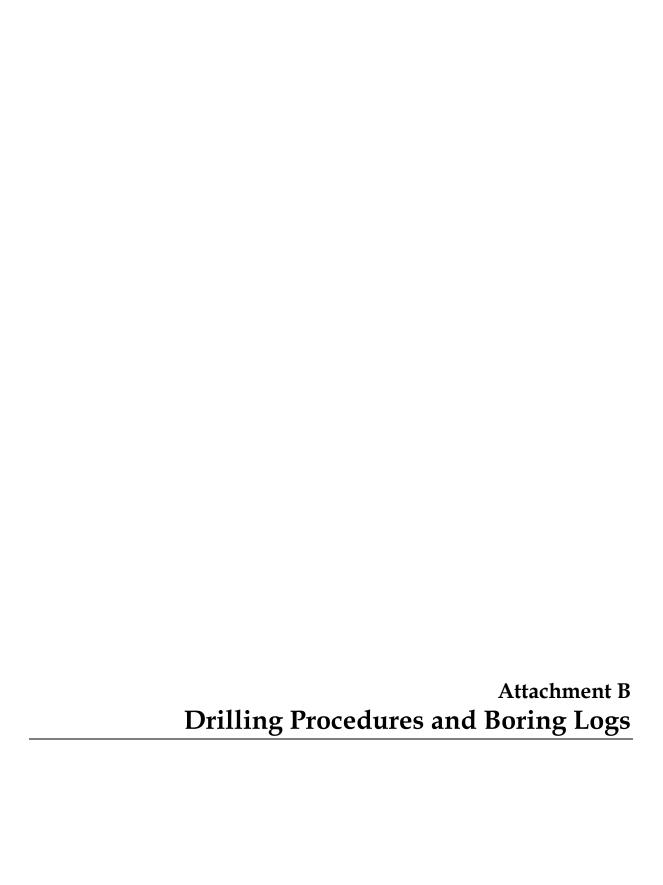
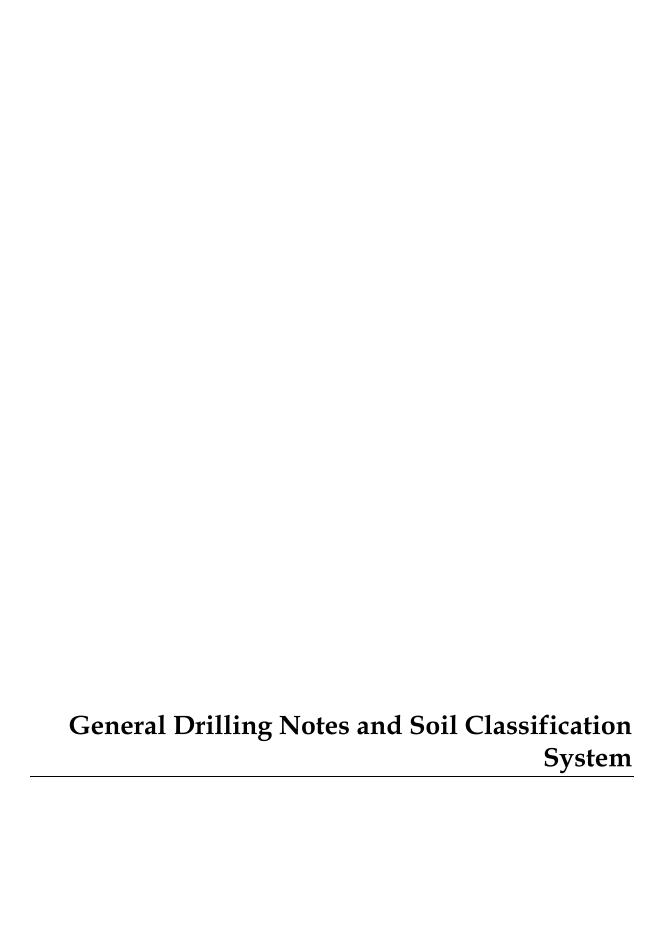


Figure 2 - Plan Alignment and Profile
Pebble Creek West Alternative
Waukesha West Bypass
July 2011









| | GESTRA ENGINEERING, | NERAL NOTES | |
|---------|---|-------------|---|
| | DRILLING AND SAMPLING SYMBOLS | | TEST SYMBOLS |
| SYMBOL | DEFINATION | SYMBOL | DEFINATION |
| HSA | 3 1/4" I.D. hollow Stem Auger | WC | Water Content - % of Dry Wt ASTM D 2216 |
| RWB | Rotary Wash Boring (Mud Drilling) | OC | Organic Content - % of Dry Wt ASTM D 2974 |
| _FA | 4", 6" or 10" Diameter Flight Auger | DD | Dry Density – Pounds Per Cubic Foot |
| HA | 2", 4" or 6" Hand Auger | LL, PL | Liquid and Plastic Limit – ASTM D 4318 |
| _DC | 2 1/2", 4", 5" or 6" Steel Drive Casing | | |
| _RC | Size A, B, or N Rotary Casing | | Additional Insertions in Last Column |
| PD | Pipe Drill or Cleanout Tube | Qu | Unconfined Comp. Strength-psf – ASTM D 2166 |
| CS | Continuous Split Barrel Sampling | Qp | Penetrometer Reading – Tons/Square Foot |
| DM | Drill Mud | Ts | Torvane Reading – Tons/Square Foot |
| JW | Jetting Water | G | Specific Gravity – ASTM D 854 |
| SB | 2" O.D. Split Barrel Sample | SL | Shrinkage Limits – ASTM D 427 |
| | | OC | Organic Content – Combustion Method |
| _L | 2 1/2" or 3 1/2" O.D. SB Liner Sample | SP | Swell Pressure - Tons/Square Foot |
| ST | 2" or 3" Thin Walled Tube Sample | PS | Percent Swell |
| 3TP | 3" Thin Walled Tube (Pitcher Sampler) | FS | Free Swell – Percent |
| _TO | 2" or 3" Thin Walled Tube (Osterberg Sampler) | pН | Hydrogen Ion Content. Meter Method |
| W | Wash Sample | SC | Sulfate Content – Parts/ Million, same as mg/L |
| В | Bag Sample | CC C* | Chloride Content - Parts/ Million, same as mg/L |
| P | Test Pit Sample | Oc* | One Dimensional Consolidation – ASTM D 2453 |
| _Q | BQ, NQ, or PQ Wireline System | D.S.* | Triaxial Compression Direct Shear – ASTM D 3080 |
| _X | AX, BX, or NX Double Tube Barrel | K* | Coefficient of Permeability – cm/sec |
| _ CR | Core Recovery – Percent | D* | Dispersion test |
| NSR | No Sample Recovered, classification based on action of | DH* | Double Hydrometer – ASTM D 4221 |
| 1,011 | drilling, equipment and/or material noted in drilling fluid | MA* | Particle Size Analysis – ASTM D 422 |
| | or on sampling bit. | R | Laboratory Receptivity, in ohm – cm – ASTM G 57 |
| NMR | No Measurement Recorded, primarily due to presence of | E* | Pressuremeter Deformation Modulus – TSF |
| INIVIIX | · 1 | PM* | Pressuremeter Test |
| | drilling or coring fluid. | VS* | Field Vane Shear – ASTM D 2573 |
| | W | IR* | Infiltrometer Test – ASTM D 3385 |
| • | Water Level Symbol | RQD | Rock Quality Designation – Percent |
| l | | | *G 1 11 |

*See attached data sheet or graph

WATER LEVEL

Water levels shown on the boring logs are the levels measured in the borings at the time and under the conditions indicated. In sand, the indicated levels may be considered reliable ground water levels. In clay soil, it may not be possible to determine the ground water level within the normal time required for test borings, except where lenses or layers of more pervious waterbearing soil are present. Even then, an extended period of time may be necessary to reach equilibrium. Therefore, the position of the water level symbol for cohesive or mixed texture soils may not indicate the true level of the ground water table. Perched water refers to water above an impervious layer, thus impeded in reaching the water table. The available water level information is given at the bottom of the log sheet.

| DENSITY TERM Very Loose Loose Medium Dense Dense Very Dense Standard "N" Penetr | "N" VALUE 0-4 4-10 10-30 30-50 Over 50 ration: per ASTM | CONSISTENCY TERM Very Soft Soft Medium Stiff Stiff Very Stiff Hard D1586 | qu/qp VALUE (tsf) <0.25 0.25 - 0.49 0.5 - 0.99 1.0 - 1.99 2.0 - 3.99 4.0+ | "N" VALUE 0-2 2-4 4-8 8-16 16-30 Over 30 | Lamination Layer Lens Varved Dry Moist Wet Water bearing | Up to 1/2" thick stratum 1/2" to 6" thick stratum 1/2" to 6" discontinuous stratum Alternating laminations Powdery, no noticeable water Below saturation Saturated, above liquid limit Pervious soil below water |
|--|---|---|--|---|--|--|
|--|---|---|--|---|--|--|

| RE | LATIVE GRAVEL PROPO | ORTIONS | REI | ATIVE SIZES |
|----------------------|---------------------|---------|-------------|------------------------------|
| CONDITION | TERM | RANGE | Boulder | Over 12" |
| Coarse Grained Soils | trace of gravel | 2-14% | Cobble | 3" - 12" |
| | with gravel | 15-49% | Gravel | |
| Fine Grained Soils | | | Coarse | 3/4" - 3" |
| 15-29% + No. 200 | trace of gravel | 2-14% | Fine | #4 – 3/4" |
| 15-29% + No. 200 | with gravel | 15-29% | Sand | |
| | | | Coarse | #4 - #10 |
| 30% + No. 200 | trace of gravel | 2-14% | Medium | #10 - #40 |
| 30% + No. 200 | with gravel | 15-24% | Fine | #40- #200 |
| 30% + No. 200 | gravelly | 25-49% | Silt & Clay | - # 200, Based on Plasticity |

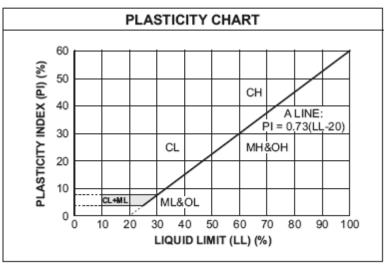
Unified Soil Classification System (USCS)

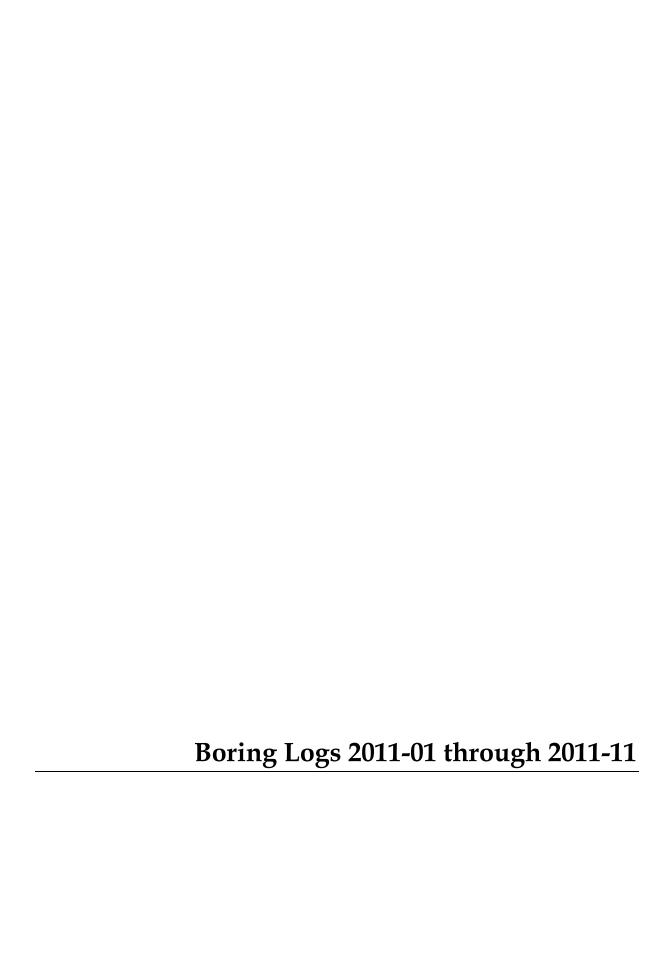
| UNIFIED SOI | L CLASS | IFICATION AND SYMBOL CHART |
|-------------------------------------|--------------------|--|
| | COAF | RSE-GRAINED SOILS |
| (more than | 50% of mat | erial is larger than No. 200 sieve size.) |
| | Clean | Gravels (Less than 5% fines) |
| GRAVELS | GW | Well-graded gravels, gravel-sand mixtures, little or no fines |
| More than 50% of coarse | GP | Poorly-graded gravels, gravel-sand mixtures, little or no fines |
| fraction larger than No. 4 | Grave | s with fines (More than 12% fines) |
| sieve size | GM | Silty gravels, gravel-sand-silt mixtures |
| | GC | Clayey gravels, gravel-sand-clay mixtures |
| | Clean | Sands (Less than 5% fines) |
| SANDS | sw | Well-graded sands, gravelly sands, little or no fines |
| 50% or more of coarse | SP | Poorly graded sands, gravelly sands, little or no fines |
| fraction smaller than No. 4 | Sands | with fines (More than 12% fines) |
| tnan No. 4 sieve size | SM | Silty sands, sand-silt mixtures |
| | sc | Clayey sands, sand-clay mixtures |
| | FINE | GRAINED SOILS |
| (50% or m | ore of mate | rial is smaller than No. 200 sieve size.) |
| SILTS AND | ML | Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity |
| CLAYS Liquid limit less than | CL | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays |
| 50% | | Organic silts and organic silty clays of low plasticity |
| SILTS | МН | Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts |
| AND CLAYS Liquid limit 50% | СН | Inorganic clays of high plasticity, fat clays |
| or greater | ОН | Organic clays of medium to high plasticity, organic silts |
| HIGHLY ORGANIC SOILS | 3년 년 3 PT 3년 | Peat and other highly organic soils |

| | LABORATORY CLAS | SIFICATION CRITERIA |
|----|--|--|
| | | |
| GW | $C_u = \frac{D_{60}}{D_{10}}$ greater than | 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3 |
| GP | Not meeting all gradation re | equirements for GW |
| GM | Atterberg limits below "A" line or P.I. less than 4 | Above "A" line with P.I. between 4 and 7 are borderline cases |
| GC | Atterberg limits above "A" line with P.I. greater than 7 | requiring use of dual symbols |
| sw | $C_u = \frac{D_{60}}{D_{10}}$ greater than | 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3 |
| SP | Not meeting all gradation re | equirements for GW |
| SM | Atterberg limits below "A" line or P.I. less than 4 | Limits plotting in shaded zone with P.I. between 4 and 7 are |
| sc | Atterberg limits above "A" line with P.I. greater than 7 | borderline cases requiring use of dual symbols. |

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent _______ GW, GP, SW, SP More than 12 percent _______ GM, GC, SM, SC 5 to 12 percent _______ Borderline cases requiring dual symbols





Gestra Engineering Inc. 7600 75th Street, Suite206 Kenosha, WI 53142 phone: (262) 925-1885; fax (262) 925-1888 BORING DRILLED BY FIRM: Gestra

WATER ENCOUNTERED DURING DRILLING (FT): 0

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WATER LEVEL AT COMPLETION (FT): 3

WATER LEVEL AFTER (FT): N/A

SOIL BORING LOG

DATE DRILLING STARTED Waukesha By-Pass 2/24/2011

DATE DRILLING ENDED

BORING NUMBER 2011-1 PROJECT NUMBER 10031-10

DRILLING RIG 2/24/2011

DRILLING METHOD

Diedrich D50

1 of 1

WET DRY DRY DRY DRY

FIELD LOG

PROJECT NAME

PROJECT LOCATION

Waukesha, WI

NORTHING B. Sargent

365000

31/4" HSA

| | /I: Ges W Ch | | Woerpel | | | LAB LOG / QC | E. Jeske | EASTI | NG | | | 459 | 731 | | SURFACE ELEVATION 799.6 f |
|--------------------|------------------|-------------|-----------|--------------|------------------------------------|--|-----------|---------------------|-------------------------|--------------|---|--------------|------------------|----------------------|---|
| Number and Type | Recovery (in) | Blow Counts | N - Value | Depth (ft) | and | Soil Description I Geological Origin for Each Major Unit | | USCS Classification | Graphic | Well Diagram | Unconfined Comp. Strength $(\mathbf{Q}_{\!_{\mathbf{Q}}} \text{ or } \mathbf{Q}_{\!_{\mathbf{p}}})$ (tsf) | Liquid Limit | Plasticity Index | Moisture Content (%) | Comments |
| SS - 1 | 18 | 6 1 1 | 2 | | PEAT, black, we | t | | | 77 77 77 77 77 77 | | | | | 45.7 | LOI = 5.1% Sample SS-1 is frozen |
| SH - 2 | 16 | | | _ <u>Ā</u> _ | LEAN CLAY, gra | y to green with yellow mot | ling, wet | CL | | | 0.79 | | | 228.1 25 | LOI = 21.9% γ_d = 102.4 pcf γ_T = 126.8 pcf |
| SS - 3 | 18 | 5 6 8 | 14 | 5 794.6 | | ND, with silt, brown, wet, | | SP-SM | | | | | | | Gravel = 4.6% Sand = 80.5% P200 =14.9% |
| SS - 4 | 18 | 4 6 7 | 13 | 10 789.6 | SILT, gray, wet SILTY CLAY, gra | ay, wet, stiff | | ML CL-ML | | | | | | 14.9 | |
| SS - 5 | 18 | 2 3 4 | 7 | | | y, wet, medium stiff to stiff | | CL | | 0 | .75-1.5 | 0 | | 20.7 | |
| 9 - SS | 18 | 1 2 3 | 5 | 15 784.6 | | h sand and silt lamination, f to stiff 15.0' | gray, | CL-ML | | 0 | .75-1.0 | 0 | | 18.7 | |
| | | | | | | TER & CAVE-IN OBS | | | | | | | | | |

CAVE DEPTH AT COMPLETION (FT): N/A

CAVE DEPTH AFTER HOURS (FT): N/A

Gestra Engineering Inc. 7600 75th Street, Suite206 Kenosha, WI 53142 phone: (262) 925-1885; fax (262) 925-1888 BORING DRILLED BY FIRM: Gestra

SOIL BORING LOG

PROJECT NAME DATE DRILLING STARTED Waukesha By-Pass 2/23/2011

PROJECT LOCATION Waukesha, WI

DATE DRILLING ENDED 2/23/2011 PROJECT NUMBER 10031-10

1 of 1

2011-2

DRILLING RIG Diedrich D50 DRILLING METHOD

BORING NUMBER

| BIORING PRILLED BY FIRM: Gestra CREW CHIEF: A. Woerpel | | | | 1000 | | FIELD LOG B. Sargent LAB LOG / QC | B. Sargent NORTHING EASTING | | | 364 | 675 | | DRILLING METHOD 31/4" HSA SURFACE ELEVATION | |
|--|---------------|------------------|-----------|--|--------------------------|---|-----------------------------|---------|--------------|--|--------------|------------------|---|---|
| CR | =W Cl | HIEF: A. | Woerpel | | | E. Jeske | | | | | 460 | 023 | | 800.2 ft |
| Number and Type | Recovery (in) | Blow Counts | N - Value | O the contract of the contract | Deput (it) Elevation | Soil Description and Geological Origin for Each Major Unit | USCS Classification | Graphic | Well Diagram | Unconfined Comp. Strength $(\mathbf{Q}_{\nu} \text{ or } \mathbf{Q}_{\rho})$ (tsf) | Liquid Limit | Plasticity Index | Moisture Content (%) | Comments |
| SS - 1 | 12 | 2 2 2 | 4 | - | - | ORGANIC CLAY, with vegetation, black, moist to very moist, very soft | ОН | | | 0.00 | | | 48.7 | LOI = 9.2% |
| SH - 2 | 9 | | | - | - Ā - | LEAN CLAY, gray to green with yellow mottling, wet | CL | | | 0.85 | | | 36.7 | $\gamma_d = 91.1 \text{ pcf}$ $\gamma_T = 124.5 \text{ pcf}$ LOI = 2.1% |
| SS - 3 | 14 | 2 2 2 2 | 4 | 5 | <u>√</u> 795.2 - - | SANDY SILT, fine grained sand, brown and gray mottled, wet, loose | ML | | | | | | 19.8 | |
| SS - 4 | 18 | 1 2 3 | 5 | 10 | 790.2 | LEAN CLAY, with thin sand seams and lamination, brownish gray, wet, stiff to very stiff | | | 1 | .00-1.2 | 5 | | 22.7 | |
| SS - 5 | 15 | 3 5 6 | 11 | - | - T | | CL | | 2 | .25-3.0 | 0 | | 26.3 | |
| 9 - SS | 16 | 5 7 11 | 18 | 15 | 785 <u>.2</u> | fine to coarse SAND, little gravel, brown, wet, medium dense End of Boring at 15.0' | SP | | | | | | | |
| | | | | _ | - | | | | | | | | | |
| | | | | 20 | 780.2 | WATER & CAVE IN ORSERVATIO | | | | | | | | |

WATER & CAVE-IN OBSERVATION DATA

| _ | WATER ENCOUNTERED DURING DRILLING (FT): 5 | CAVE DEPTH AT COMPLETION (FT): N/A | WET DRY |
|---------|---|------------------------------------|---------|
| $ar{A}$ | WATER LEVEL AT COMPLETION (FT): 2 | CAVE DEPTH AFTER HOURS (FT): N/A | WET DRY |
| V | WATER LEVEL AFTER (FT): N/A | | |

PROJECT NAME Waukesha By-Pass Gestra Engineering Inc. 7600 75th Street, Suite 206 Kenosha, WI 53142 phone: (262) 925-1885; fax (262) 925-1888 PROJECT LOCATION Waukesha, WI

SOIL BORING LOG 1 of 1 DATE DRILLING STARTED BORING NUMBER 2011-3 2/23/2011 PROJECT NUMBER DATE DRILLING ENDED 10031-10 DRILLING RIG 2/23/2011 Diedrich D50

| pho | NG DRILLED BY FIELD LOG | | | | | | NORTHING | | | 212 | 23/20 | , , , | | Diedrich D50 DRILLING METHOD | | |
|--------------------|-------------------------|--------------|-----------|---------------------------|---|--|-----------------------|---------------------|---------|--------------|--|--------------|--------------------|-------------------------------|--|--|
| | M: Ges | | | | | E | 3. Sargent | INORI | HING | | | 364 | 459 | | 31/4" HSA | |
| CRE | EW CH | HEF: A. | Woerpel | | | LAB LOG / QC | E. Jeske | EASTI | NG | | | 460 | 288 | | SURFACE ELEVATION 799.9 ft | |
| | | | | | T | | L. Jeske | | | | | 400 | 200 | | 7 99.9 11 | |
| Number and Type | Recovery (in) | Blow Counts | N - Value | Depth (ft) Elevation - | and | Soil Description I Geological Origin for Each Major Unit | | USCS Classification | Graphic | Well Diagram | Unconfined Comp. Strength $(\mathbf{Q}_{\mathbf{u}} \text{ or } \mathbf{Q}_{p})$ (tsf) | Liquid Limit | Plasticity Index - | Moisture Content (%) - | Comments | |
| | | | | | ORGANIC CLAY | , with vegetation, black, m | oist to | | | | | | | | LOI = 2.9% | |
| SS - 1 | 9 | 1 1 2 | 3 | - · | very moist (TOP: LEAN CLAY, with medium stiff | SOIL) h peaty layers, olive gray, r | moist, | CL | | 0 | 50-0.7 | 5 | | 32 | u = 114 5 pof | |
| SH - 2 | 20½ | | | | LEAN CLAY, with gray with brown | n silty and sand pockets, b mottling, moist, soft to med | olueish dium stiff | CL | | 0.: | 25-0.7 0.47 | 5 | | 18.4 | | |
| | | | | | | | | | | | | | | | | |
| SS - 3 | 15 | 3 3 5 | 8 | 5 794.9 | | dium SAND, brownish gra et, loose | y with rust | | | | | | | 19.3 | Gravel = 0.0% Sand = 40.3% P200 =59.7% | |
| | | | | _ | | | | SM | | | | | | | | |
| | | | | Ā. | | | | | | | | | | | | |
| SS - 4 | 18 | 4 5 7 | 12 | - | LEAN CLAY bro | wnish gray and gray, wet, | very stiff | | | | | | | 26.2 | | |
| | | | | - | | willon gray and gray, wet, | very sum | CL | | | | | | | | |
| | | | | 10 789. | | ND with ailt and ailt lavor | o little | | | | | | | | | |
| SS - 5 | 18 | 7 5 12 | 17 | | gravel, brown an | ND, with silt and silt layer d gray, wet, medium dens | e ittie | | | | | | | | | |
| | | | | | - | | | | | | | | | | | |
| | | | | - | _ | | | SP-SM | | | | | | | | |
| 9 - SS | 18 | 6 7 11 | 18 | | - | | | | | | | | | | No sample retained | |
| | | | | 15 784.9 | End of Boring at | 15.0' | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | _ | | | | | | | | | | | |
| | | | | - | | | | | | | | | | | | |
| | | | | - | - | | | | | | | | | | | |
| | | | | 20 779.9 | · | TED 9 CAVE IN ODS | | | | | | | | | | |

| | WATER & CAVE-IN OBSERVATION DATA | | | | | | | | | | | | | | | | | | |
|---|----------------------------------|----------|---------|-------------|----------|-----|--|---|---------|--------|-------|--------|---------|--------|--|--|--|------------|----------------|
| _ | WATER ENG | OUNTER | ED DURI | NG DRILLIN | IG (FT): | 7.5 | | 屬 | CAVE DE | PTH AT | г сом | IPLETI | ON (F1 |): N/A | | | | WET DRY | \blacksquare |
| $\bar{\mathbf{\Lambda}}$ | WATER LEV | EL AT CO | MPLETIO | N (FT): 2.5 | 5 | | | | CAVE DE | PTH AF | TER H | HOURS | S (FT): | N/A | | | | WET DRY | \blacksquare |
| ▼ WATER LEVEL AFTER (FT): N/A | | | | | | | | | | | | | | | | | | | |
| NOTE: Stratification lines between soil types represent the approximate boundary: gradual transition between in-situ soil layers should be expected | | | | | | | | | | | | | | | | | | | |

SOIL BORING LOG HDSTRA 1 of 1 PROJECT NAME DATE DRILLING STARTED BORING NUMBER 2011-4 2/24/2011 Waukesha By-Pass PROJECT NUMBER Gestra Engineering Inc. 7600 75th Street, Suite 206 PROJECT LOCATION DATE DRILLING ENDED 10031-10 /000 /5th Street, Sui Kenosha, WI 53142 DRILLING RIG Waukesha, WI 2/24/2011 Diedrich D50 885; fax (262) 925-1888 BORING DRILLED BY FIELD LOG NORTHING DRILLING METHOD 31/4" HSA B. Sargent 364145 FIRM: Gestra LAB LOG / QC EASTING SURFACE ELEVATION CREW CHIEF: A. Woerpel E. Jeske 460720 797.4 ft Unconfined Comp. Strength (**Q**_u or Q_p) (tsf) Moisture Content (%) **USCS Classification** Plasticity Index Well Diagram Blow Counts Liquid Limit Depth (ft) Elevation N - Value Graphic Soil Description Comments and Geological Origin for Each Major Unit ORGANIC CLAY, with vegetation, black, wet (TOPSOIL) 2 2 4 31.3 15 LEAN CLAY, with sand, olive gray, very moist, medium stiff to stiff \mathbf{I} Color change to blueish gray at 2.0' 5" thick pocket of medium to coarse grained sand at 17 0.5-0.75 28.6 SH CL 792.4 Color change to gray in sample SS-3 2 3 3 6 1.50 26.7 SS 18 3 6 2 SS 16 8 23.1 ALTERNATING CLAY and SAND layers, gray, wet CL/ SC fine to coarse SAND, with gravel, brown, wet, medium dense 787.4 10 SS 18 4 7 11 SP 5 5 7 12 SS 18 782.4 15 End of Boring at 15.0'

WATER & CAVE-IN OBSERVATION DATA WATER ENCOUNTERED DURING DRILLING (FT): 0 WATER LEVEL AT COMPLETION (FT): 2 WATER LEVEL AFTER (FT): N/A WATER LEVEL AFTER (FT): N/A

NOTE: Stratification lines between soil types represent the approximate boundary, gradual transition between in-situ soil layers should be expected.

777.

PROJECT NAME Gestra Engineering Inc. 7600 75th Street, Suite206 Kenosha, WI 53142 phone: (262) 925-1885; fax (262) 925-1888 BORING DRILLED BY PROJECT LOCATION FIRM: Gestra

SOIL BORING LOG

DATE DRILLING STARTED 2/24/2011

BORING NUMBER PROJECT NUMBER

Waukesha By-Pass

DATE DRILLING ENDED

10031-10

1 of 1

2011-5

DRILLING RIG Waukesha, WI 2/24/2011 Diedrich D50 DRILLING METHOD FIELD LOG NORTHING 31/4" HSA B. Sargent 363763

| FIRM | /I: Ges | stra | \A/ I | | | | LAB LOG / QC | gent | EASTI | NG | | | 363 | 763 | | 31/4" HS |
|--------------------|------------------|-------------|-----------|-----------|--------------|---------------------------------|--|-----------|---------------------|---------|--------------|---|--------------|------------------|----------------------|--|
| CRE | W CF | HEF: A. | Woerpel | | | | E. Je | eske | | | | | 461 | 106 | | 798.3 |
| Number and Type | Recovery (in) | Blow Counts | N - Value | Denth (#) | Elevation | and | Soil Description I Geological Origin for Each Major Unit | | USCS Classification | Graphic | Well Diagram | Unconfined Comp. Strength (Q _u or Q _p) (tsf) | Liquid Limit | Plasticity Index | Moisture Content (%) | Comments |
| | | | | | | ORGANIC CLAY | , with sand and vegetation, blac | k, | | | | | | | | LOI = 12.2% |
| SS - 1 | 7 | 1 1 3 | 4 | _ | | moist, stiff | | | OL | | | 1.00 | | | 55.4 | |
| SH - 2 | 19½ | | | | | | erbedded layers of fine to mediur ray, moist | | CL | | | 0.5-1.0 | | | 19.9 | $\gamma_{d} = 111.9 \text{ pcf}$ $\gamma_{T} = 134.2 \text{ pcf}$ |
| Ŗ | 19/2 | | | | | - | y to reddish brown/ rusty brown, tiff to stiff | | CL | | , | 1.04 | | | 19.9 | |
| | | | | 5 | 793 | | y, moist, stiff to very stiff | | | | | | | | | |
| SS - 3 | 18 | 4 4 5 | 9 | _ | Ā | | y, most, sun to very sun | | CL | | 1. | 75-2.5 | 0 | | 24.7 | |
| | | | | | | 1 | | | | | | | | | | |
| SS - 4 | 18 | 4 2 6 | 8 |] - | | SILT, with clays | eams, brown, moist, loose | | ML | | | | | | 22.2 | |
| | | | | 10 | <u>√</u> 788 | 3 | | | | | | | | | | |
| SS - 5 | 18 | 3 4 7 | 11 | - | -⊼.00 | SILTY fine to coaseam in sample | arse SAND, with gravel and clay SS-5, brown, wet, medium dens | e | | | | | | | | |
| | | | | _ | | _ | | , | SM | | | | | | | |
| | | | | \dashv | | | | | | | | | | | | |
| SS - 6 | 18 | 4 7 | 16 | t | | - | | | | | | 1.00 | | | 19.6 | |
| တ | | 9 | | 15 | 783 | 9 | h sand, gray, wet, stiff | | CL | | | | | | | |
| | | | | | | End of Boring at | 15.0' | | | | | | | | | |
| | | | | - | | _ | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | + | | † | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | Γ | | | | | | | | | | | | |
| | | | | - | | _ | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | 20 | 778 | | TER & CAVE-IN OBSER | /A T: 01: | D 4 | | | | | | | |

WATER & CAVE-IN OBSERVATION DATA

| _ | WATER ENCOUNTERED DURING DRILLING (FT): 10 | CAVE DEPTH AT COMPLETION (FT): N/A | WET L |
|-----------------|--|------------------------------------|---------|
| $\bar{\Lambda}$ | WATER LEVEL AT COMPLETION (FT): 7 | CAVE DEPTH AFTER HOURS (FT): N/A | WET DRY |
| ▼ | WATER LEVEL AFTER (FT): N/A | | |

SOIL BORING LOG 1 of 1 PROJECT NAME DATE DRILLING STARTED BORING NUMBER 2011-6 2/25/2011 Waukesha By-Pass PROJECT NUMBER Gestra Engineering Inc. 7600 75th Street, Suite206 Kenosha, WI 53142 PROJECT LOCATION DATE DRILLING ENDED 10031-10 DRILLING RIG Waukesha, WI 2/25/2011 Diedrich D50 885; fax (262) 925-1888 BORING DRILLED BY FIELD LOG NORTHING DRILLING METHOD 31/4" HSA B. Sargent 362882 FIRM: Gestra LAB LOG / QC EASTING SURFACE ELEVATION CREW CHIEF: A. Woerpel E. Jeske 461567 812 ft Unconfined Comp. Strength $(\mathbf{Q}_{\!_{\mathbf{Q}}} \text{ or } \mathbf{Q}_{\!_{\mathbf{p}}})$ (tsf) Moisture Content (%) **USCS** Classification Plasticity Index Well Diagram Blow Counts Liquid Limit Elevation Depth (ft) N - Value Graphic Soil Description Comments and Geological Origin for Each Major Unit LOI = 68% PEAT, black, wet 11 /1 2 1, 11, 2 432.2 SS 5 1 <u>// // //</u> 1 1, 11, 403.7 Clay portion of the samle is disturbed unable to get Qp With layers of blueish gray clay below 2.0' 11/ value LOI = 55.1% 18 SH 63.8 LEAN CLAY, blueish gray, moist LOI = 4% CL 807.0 fine to coarse SAND, with silt and gravel, brown, Gravel = 31.4% Sand = 57.7% P200 =10.9% wet, medium dense 11 8 $oldsymbol{\mathbb{Z}}$ 18 21 SS 13 SP-SM LEAN CLAY, with sand, brown, moist, medium stiff to stiff 26 0 75-1.00 SS 13 8 19.2 CL 802.0 10 SANDY CLAY, fine to coarse grained sand, with 3 7 20.7 SS 6 10 gravel, brown, wet, medium dense to dense CL 10 20 23 9 43 8.3 SS 797.0 15 End of Boring at 15.0'

WATER & CAVE-IN OBSERVATION DATA WATER ENCOUNTERED DURING DRILLING (FT): 0 WATER LEVEL AT COMPLETION (FT): 6 CAVE DEPTH AT COMPLETION (FT): N/A WATER LEVEL AFTER (FT): N/A WATER LEVEL AFTER (FT): N/A

NOTE: Stratification lines between soil types represent the approximate boundary, gradual transition between in-situ soil layers should be expected.

792.0

PROJECT NAME Waukesha By-Pass Gestra Engineering Inc. 7600 75th Street, Suite206 Kenosha, WI 53142 phone: (262) 925-1885; fax (262) 925-1888 PROJECT LOCATION Waukesha, WI

SOIL BORING LOG 1 of 1 DATE DRILLING STARTED BORING NUMBER 2011-7 2/24/2011 PROJECT NUMBER DATE DRILLING ENDED 10031-10 DRILLING RIG 2/24/2011 Diedrich D50

| pho | ne: (262) | 925-1885; | fax (262) 925-1 | 1888 | | vv aukesna, | | | | | | 212 | 4/20 | , , , | | | edrich D50 |
|--------------------|------------------|---------------|-----------------|------------|-------------|---|---|-----------------------|---------------------|--|--------------|---|--------------|------------------|----------------------|-------------------|------------|
| | DRILLE | | | | | | FIELD LOG | B. Sargent | NORT | HING | | | 362 | 422 | | DRILLING METHOD | 31/4" HSA |
| CRE | Λ: Ges W Ch | llEF: A. | Woerpel | | | | LAB LOG / QC | E. Jeske | EASTI | NG | | | | 880 | | SURFACE ELEVATION | |
| | | | | | | | | E. JESKE | | | | | 401 | 000 | | | 800.6 ft |
| Number and Type | Recovery (in) | Blow Counts | N - Value | Depth (ft) | ∑ Elevation | | Soil Description d Geological Origin fo Each Major Unit | or | USCS Classification | Graphic | Well Diagram | Unconfined Comp. Strength $(\mathbf{Q}_u \text{ or } \mathbf{Q}_p)$ (tsf) | Liquid Limit | Plasticity Index | Moisture Content (%) | Comments | 8 |
| 1 | | _ | | | | PEAT, black, we | t (TOPSOIL) | | | 71 7 | | | | | | LOI = 19.4% | |
| SS - 1 | 4 | 2 1 1 | 2 | - | <u>Ā</u> − | | | | | 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1 | | | | | 150.2 | | |
| SH - 2 | 16 | | | - | - | 3"-4" sand and g | eish gray, wet, stiff ravel layer brownish gray at 3.0' | | CL | | | 1.25 | | | 21.7 | | |
| | | | | 5 | 795.6 | | | | | | | | | | | | |
| SS - 3 | 18 | 2 4 4 | 8 | - | _ | SILT, with clayey | / layers, brown, moist, | loose | ML | | | | | | 18.1 | | |
| | | | | - | + | SANDY SILT, ½" | thick clay layer in SS- | | | | | | | | | | |
| SS - 4 | 18 | 2 3 6 | 9 | - - | - | medium grained | sand, brown, very moi | st, loose | ML | | | | | | 31.1 | | |
| | | | | 10 | 790.6 | | | | | | | | | | | | |
| SS - 5 | 12 | 12 8 10 | 18 | | - | fine to coarse SA gravel pieces in s medium dense | AND, with gravel (large sample SS-5) and silt, | fractured brown, wet, | | | | | | | | | |
| | | | | <u>-</u> | - | | | | SP-SM | | | | | | | | |
| 9 - SS | 18 | 4 3 7 | 10 | 15 | - 785.6 | | SAND, brown, wet, med | dium dense | SP | | | | | | | | |
| | | | | | 780.6 | | 15.0' | | | | | | | | | | |

| | WATER & CAVE-IN OBSERVATION DATA | | | | | | | | | | | |
|-----------------|---|---|------------------------------------|----------------|--|--|--|--|--|--|--|--|
| | WATER ENCOUNTERED DURING DRILLING (FT): 0 | 屬 | CAVE DEPTH AT COMPLETION (FT): N/A | WET ☐ DRY ☐ | | | | | | | | |
| $\bar{\Lambda}$ | WATER LEVEL AT COMPLETION (FT): 2 | | CAVE DEPTH AFTER HOURS (FT): N/A | WET DRY | | | | | | | | |
| Ī | ▼ WATER LEVEL AFTER (FT): N/A | | | | | | | | | | | |
| NOT | NOTE: Stratification lines between soil types represent the approximate houndary; gradual transition between in-situ soil layers should be expected | | | | | | | | | | | |

Gestra Engineering Inc. 7600 75th Street, Suite206 Kenosha, W1 531 42 phone: (262) 925-1885; fax (262) 925-1888 BORING DRILLED BY FIRM: Gestra CREW CHIEF: A. Woerpel

SOIL BORING LOG

DATE DRILLING STARTED 2/23/2011

1 of 1
BORING NUMBER
2011-8
PROJECT NUMBER

Waukesha By-Pass

PROJECT NAME

DATE DRILLING ENDED

10031-10

77000 75th Street, Suite 2006
Kenosha, WI 35142
phonie: (262) 925-1885; fax (262) 925-1888

Waukesha, WI

FIELD LOG
B. Sargent

B. Sargent

B. Sargent

FIELD LOG
B. Sargent

FI

| CRE | W CF | HEF: A. | Woerpel | | LAB LUG / QC | E. Jeske | EASII | 140 | | 459 | 974 | | 821.9 ft |
|--------------------|------------------|----------------|-----------|----------------------------|--|---------------|---------------------|---------|--|--------------|------------------|----------------------|-------------------------------------|
| Number and Type | Recovery (in) | Blow Counts | N - Value | Depth (ft) Elevation | Soil Description and Geological Origin for Each Major Unit | | USCS Classification | Graphic | Well Diagram Unconfined Comp. Strength (Q _o or Q _p) (tsf) | Liquid Limit | Plasticity Index | Moisture Content (%) | Comments |
| SS - 1 | 7 | 3 3 4 | 7 | | LEAN CLAY, trace gravel, dark brown, mostiff | oist, soft to | CL | | 0.50-1.0 | 0 | | 22 | |
| SH-2 | 7 | | | | Color change to tan/ light brown at 2.0' | | | | 0.25 | | | 14.8 | from 3.0' to 5.0' |
| | | | | | GRAVEL | | GP | | | | | | Driller noted hard drilling at 3.0' |
| SS - 3 | 16 | 8 6 8 | 14 | 5 816 <u>.9</u> | LEAN CLAY, little gravel, tan with gray moist, very stiff | ottling, | | | 3.25 | | | 18 | |
| SS - 4 | 6 | 16 26 28 | 54 | - <u>*</u> - | With silty sand seams in sample SS-4 | | CL | | | | | 18.5 | Pushed stone while sampling |
| SS - 5 | 15 | 16 20 23 | 43 | 10 <u>7</u> 811 <u>.</u> 9 | SANDY SILT, fine grained sand, with grawet, dense (GLACIAL TILL) | vel, tan, | | | | | | 9.2 | |
| | | | | | | | ML | | | | | | |
| 9 - SS | 15 | 18 23 22 | 45 | 15 806 <u>.</u> 9 | SANDY SILT, fine grained sand, gray, we (GLACIAL TILL) End of Boring at 15.0' | t, dense | ML | | | | | 10.6 | |
| | | | | | End of boiling at 15.0 | | | | | | | | |
| | | | | 20 801.9 | . WATER & CAVE IN OF | | | | | | | | |

WATER & CAVE-IN OBSERVATION DATA

| _ | WATER ENCOUNTERED DURING DRILLING (FT): 10 | CAVE DEPTH AT COMPLETION (FT): N/A | WET ☐ DRY ☐ |
|-----------|--|------------------------------------|----------------|
| \bar{A} | WATER LEVEL AT COMPLETION (FT): 8 | CAVE DEPTH AFTER HOURS (FT): N/A | WET DRY |
| ▼ | WATER LEVEL AFTER (FT): N/A | | |

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.



SOIL BORING LOG

DATE DRILLING STARTED 2/23/2011

1 of 1 BORING NUMBER 2011-9

PROJECT NUMBER

Waukesha By-Pass

PROJECT LOCATION

PROJECT NAME

DATE DRILLING ENDED 2/23/2011 10031-10

Gestra Engineering Inc. 7600 75th Street, Suite206 Kenosha, WI 53142 phone: (262) 925-1885; fax (262) 925-1888 BORING DRILLED BY DRILLING RIG Waukesha, WI Diedrich D50 FIELD LOG DRILLING METHOD NORTHING 31/4" HSA B. Sargent 363778 FIRM: Gestra LAB LOG / QC EASTING SURFACE ELEVATION

| CRE | W CF | HEF: A. | Woerpel | | LAB LOG / QC | E. Jeske | TING | 460 | 333 | SURFACE ELEVATION 80 |
|--------------------|------------------|-------------|-----------|-----------------|---|---------------------|---------|---|---------------------------------------|---|
| Number and Type | Recovery (in) | Blow Counts | N - Value | Depth (ft) | Soil Description and Geological Origin for Each Major Unit | USCS Classification | Graphic | Well Diagram Unconfined Comp. Strength (Q _a or Q _p) (tsf) Liquid Limit | Plasticity Index Moisture Content (%) | Comments |
| SS - 1 | 15 | 1 1 3 | 4 | - | LEAN CLAY, with organics, black/ dark bro blueish gray, moist, medium stiff to stiff | wn and | | 0 75-1.00 | 34.8 | LOI = 4.9% |
| SH - 2 | 11 | | | <u>+</u> - | 2" Peat layer at 2.0' | CL | | 0.5-1.0 0.77 | 29.763 | $\gamma_d = 96.8 \text{ pcf}$ $\gamma_T = 125.6 \text{ pcf}$ 61 |
| SS - 3 | 10 | 3 4 5 | 9 | 5 80 | LEAN CLAY, with sand, gravel and roots in SS-3, gray, moist, stiff to very stiff | sample | | 1.25 | 21.5 | |
| SS - 4 | 18 | 3 7 9 | 16 | - - - | 3" thick silty sand and gravel seam | CL | | 2.50 | 20.3 | |
| SS - 5 | 12 | 7 9 6 | 15 | 10 <u>7</u> 79 | SILTY fine to coarse SAND and subrounde fractured GRAVEL, gray with brown, wet, n dense | od to sub nedium | | | | |
| 9 - SS | 18 | 5 2 4 | 6 | _ _ _ | SILTY CLAY, with silt seams, gray, wet, sti | ff CL-ML | | 1.00 | 18.1 | |
| | | | | - - | - | | | | | |
| | | | | - 20 78 | .0 WATER & CAVE-IN OBS | SEDVATION DA | ΤΔ | | | |

WATER & CAVE-IN OBSERVATION DATA

| _ | WATER ENCOUNTERED DURING DRILLING (FT): 10 | CAVE DEPTH AT COMPLETION (FT): N/A | WET DRY |
|--------------------------|--|------------------------------------|---------|
| $\bar{\mathbf{\Lambda}}$ | WATER LEVEL AT COMPLETION (FT): N/A | CAVE DEPTH AFTER HOURS (FT): N/A | WET DRY |
| ▼ | WATER LEVEL AFTER (FT): N/A | | |

Gestra Engineering Inc. 7600 75th Street, Suite206 Kenosha, WI 53142 phone: (262) 925-1885; fax (262) 925-1888 BORING DRILLED BY

SOIL BORING LOG

DATE DRILLING STARTED 2/25/2011

BORING NUMBER 2011-10 PROJECT NUMBER

DRILLING METHOD

Waukesha By-Pass PROJECT LOCATION

PROJECT NAME

DATE DRILLING ENDED 2/25/2011

10031-10 DRILLING RIG Diedrich D50

1 of 1

WET DRY DRY DRY DRY

Waukesha, WI FIELD LOG

WATER ENCOUNTERED DURING DRILLING (FT):

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WATER LEVEL AT COMPLETION (FT): N/A

WATER LEVEL AFTER (FT): N/A

NORTHING R Sargent

362845

31/4" HSA

| FIRM: Gestra | | B. Sargent | 362845 EASTING | | | | | | | | | 31/4" H | |
|---|----------------------------|---|---------------------|---------|--------------|---|--------------|--------------------|------------------------|----------|--|---------|--|
| CREW CHIEF: A. Woerp | el | E. Jeske | Brott | 140 | | | 460 | 814 | | 849.6 ft | | | |
| Number and Type Recovery (in) Blow Counts N - Value | Depth (ft) Elevation - | Soil Description nd Geological Origin for Each Major Unit | USCS Classification | Graphic | Well Diagram | Unconfined Comp. Strength $(\mathbf{Q_u} \text{ or } \mathbf{Q_p})$ (tsf) | Liquid Limit | Plasticity Index - | Moisture Content (%) - | Comments | | | |
| | LEAN CLAY, b | rown to dark brown, moist, meidum | | | | | | | | | | | |
| 15 4 5 4 5 | stiff to stiff | ely consolidated weather silt | | | | 1.00 | | | 20.4 | | | | |
| 8 SH - 2 | | , | CL | | c |).5-1.5 | | | 28.5 | | | | |
| | 5 844.6 SILTY fine to m | nedium SAND, dark brown, moist, | + | | | | | | | | | | |
| ° | loose | ledium Sand, dark blown, moist, | SM | | | | | | 10.7 | | | | |
| 4 0 | | | | | | | | | | | | | |
| 15 2 4 8 4 8 | fine SAND, light | it brown, moist, loose | SP | | | | | | | | | | |
| φ 9 11 12 32 20 32 | | SAND, with gravel and silt, brown, | SP-SM | | | | | | | | | | |
| | | · | | | | | | | | | | | |
| (0) | subrounded to moist, dense | angular GRAVEL, with sand, brown, | | | | | | | | | | | |
| φ ν ν 12 27 47 20 47 | | | | | | | | | | | | | |
| | 15 834.6 End of Boring a | at 15.0' | | 000 | | | | | | | | | |
| | | | | | | | | | | | | | |
| | 20 829.6 | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

CAVE DEPTH AT COMPLETION (FT): N/A CAVE DEPTH AFTER HOURS (FT): N/A



SOIL BORING LOG

DATE DRILLING STARTED 2/25/2011

1 of 1 BORING NUMBER 2011-11

PROJECT NUMBER

DRILLING METHOD

DRILLING RIG

PROJECT NAME Waukesha By-Pass

PROJECT LOCATION

DATE DRILLING ENDED

10031-10 Diedrich D50

WET DRY DRY DRY DRY

Waukesha, WI FIELD LOG NORTHING R Sargent

2/25/2011 362591

31/4" HSA

| FIRM | /l: Ges | stra | Woerpel | | | | LAB LOG / QC | B. Sargent | EASTI | NG | | | 362 | 591 | | 31/4" HSA SURFACE ELEVATION |
|--------------------|------------------|------------------|-----------|-----------|----------------------------------|------------------------------------|---|------------------|---------------------|---|--------------|---|--------------|--------------------|------------------------|--|
| CRE | W CF | HEF: A. | Woerpel | | | | BAB 2007 Q0 | E. Jeske | Bion | | | | 461 | 417 | | 823 f |
| Number and Type | Recovery (in) | Blow Counts | N - Value | Denth (#) | Elevation - | and | Soil Description I Geological Orig Each Major Uni | n for | USCS Classification | Graphic | Well Diagram | Unconfined Comp. Strength (Q _u or Q _p) (tsf) | Liquid Limit | Plasticity Index - | Moisture Content (%) - | Comments |
| _ | | 3 | | | | LEAN CLAY, with | h roots, little grave | I, dark brown, | | 1 | | | | | | |
| SS - 1 | 12 | 5 7 | 12 | - | - | | , | | | ·7. ·7. ·7. · · · · · · · · · · · · · · | | 1.00 | | | 22.5 | |
| | | | | | | Increase in grave | | | | <u>//</u> · <u>\\ \\ /</u> / | | | | | | |
| SS - 2 | 6 | 3 6 7 4 | 13 | | _ | SANDY CLAY, fi gravel, brown, m | ne to coarse grain oist | ed sand, with | | | | | | | 12.9 | Driller pushed split spoon due to encounter high gravel content from 1.5' to 2.0' |
| | | | | | 242.0 | | | | CL | | | | | | | |
| SS - 3 | 4 | 3 6 8 | 14 | 5 | 818 <u>.0</u> <u></u> <u></u> | | | | | | | | | | | Pushed stone, recovery seemed to be mostly cave-in material (lean clay, with roots, dark brown, moist) |
| | | | | 1 | <u>*</u> | CLAYEY fine to | coarse SAND, tan, | wet, loose | | | | | | | | moist) |
| | | | | | | | | | | | | | | | | |
| SS - 4 | 16 | 3 4 5 | 9 | <u> </u> | - | | | | | | | | | | 10.4 | |
| | | | | 10 | 813.0 | | | | sc | | | | | | | |
| SS - 5 | 16 | 3 3 4 | 7 | | Ā _ | | | | | | | | | | 9.2 | |
| | | | | | - | | | | | | | | | | | |
| | | | | | | fine to coarse SA | ND, with gravel, b | rown, wet, dense | | | | | | | | |
| SS - 6 | 17 | 7 19 23 | 42 | | - | | | | SP | | | | | | | |
| | | | | 15 | 808.0 | End of Boring at | 15.0' | | | | | | | | | |
| | | | | | - | | | | | | | | | | | |
| | | | | - | - | | | | | | | | | | | |
| | | | | 20 | 803.0 | | | | | | | | | | | |

WATER & CAVE-IN OBSERVATION DATA

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

CAVE DEPTH AT COMPLETION (FT): N/A

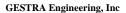
CAVE DEPTH AFTER HOURS (FT): N/A

WATER ENCOUNTERED DURING DRILLING (FT): 6.5

WATER LEVEL AT COMPLETION (FT): 11

WATER LEVEL AFTER (FT): N/A



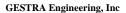




Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

| Project Name: | Waukesha B | ypass | | | Date: | 3/1 & 3/25/2011 | | | | |
|---------------------------------------|---------------|--------|--------|--------|------------|-----------------|--|--|--|--|
| Project Number: | 10031-10 | | | • | Report To: | CH2M HILL | | | | |
| Project Location: | Waukesha, V | VI | | - | 1 | | | | | |
| ASTM Designation: | D2216, D 2974 | | | • | | | | | | |
| TISTIVI Designation. | D2210, D 2774 | | | • | | | | | | |
| | | | | | | | | | | |
| Boring Number | 2011-1 | 2011-1 | 2011-1 | 2011-1 | 2011-1 | 2011-1 | | | | |
| Sample Number | 1 | 2A | 2B | 4 | 5 | 6 | | | | |
| Cup Number | CUP 90 | PC90 | G2 | 33 | 30 | 24 | | | | |
| Weight of Cup (g) | 47.78 | 47.81 | 14.34 | 15.69 | 15.96 | 16.05 | | | | |
| Weight of Wet Soil and Cup (g) | 83.18 | 157.02 | 38.88 | 67.98 | 52.80 | 69.30 | | | | |
| Weight of Dry Soil and Cup (g) | 72.07 | 81.10 | 33.97 | 61.18 | 46.49 | 60.91 | | | | |
| Weight of Soil and Cup After Burn (g) | 70.83 | 73.82 | | | | | | | | |
| Weight of Sample for Density (lbs) | | | | | | | | | | |
| Diameter (in) | | | | | | | | | | |
| Length(in) | | | | | | | | | | |
| Moisture Content (%) | 45.7 | 228.1 | 25.0 | 14.9 | 20.7 | 18.7 | | | | |
| Organic Content (%) | 5.1 | 21.9 | | | | | | | | |
| Wet Density (pcf) | | | | | | | | | | |
| Dry Density (pcf) | | | | | | | | | | |
| | | | | | | | | | | |
| Boring Number | 2011-2 | 2011-2 | 2011-2 | 2011-2 | 2011-2 | | | | | |
| Sample Number | 1 | 2 | 3 | 4 | 5 | | | | | |
| Cup Number | CUP 7 | PC-7 | 20 | 130 | 34 | | | | | |
| Weight of Cup (g) | 59.90 | 59.93 | 15.81 | 15.82 | 15.84 | | | | | |
| Weight of Wet Soil and Cup (g) | 90.53 | 114.13 | 57.32 | 51.05 | 52.39 | | | | | |
| Weight of Dry Soil and Cup (g) | 80.50 | 99.59 | 50.47 | 44.54 | 44.78 | | | | | |
| Weight of Soil and Cup After Burn (g) | 78.61 | 98.76 | | | | | | | | |
| Weight of Sample for Density (lbs) | | | | | | | | | | |
| Diameter (in) | | | | | | | | | | |
| Length(in) | | | | | | | | | | |
| Moisture Content (%) | 48.7 | 36.7 | 19.8 | 22.7 | 26.3 | | | | | |
| Organic Content (%) | 9.2 | 2.1 | | | | | | | | |
| Wet Density (pcf) | | | | | | | | | | |
| Dry Density (pcf) | | | | | | | | | | |





Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

| Project Name: Waukesha Bypass Da | | | | Date: | 3/1 & 3/25/2011 | | | | |
|---------------------------------------|---------------|--------|--------|--------|-----------------|-----------|---|--|--|
| Project Number: | 10031-10 | | | _ | Report To: | CH2M HILL | _ | | |
| Project Location: | Waukesha, W | Л | | - | • | - | | | |
| ASTM Designation: | D2216, D 2974 | | | - | | | | | |
| 716 TWI Designation. | D2210, D 2714 | | | | | | | | |
| | | | | | | | | | |
| Boring Number | 2011-3 | 2011-3 | 2011-3 | | | | | | |
| Sample Number | 1 | 2 | 4 | | | | | | |
| Cup Number | CUP 52 | 26 | 15 | | | | | | |
| Weight of Cup (g) | 59.06 | 15.76 | 15.59 | | | | | | |
| Weight of Wet Soil and Cup (g) | 83.17 | 56.98 | 48.92 | | | | | | |
| Weight of Dry Soil and Cup (g) | 77.33 | 50.57 | 42.00 | | | | | | |
| Weight of Soil and Cup After Burn (g) | 76.8 | | | | | | | | |
| Weight of Sample for Density (lbs) | | | | | | | | | |
| Diameter (in) | | | | | | | | | |
| Length(in) | | | | | | | | | |
| Moisture Content (%) | 32.0 | 18.4 | 26.2 | | | | | | |
| Organic Content (%) | 2.9 | | | | | | | | |
| Wet Density (pcf) | | | | | | | | | |
| Dry Density (pcf) | | | | | | | | | |
| | | | | | | | | | |
| Boring Number | 2011-4 | 2011-4 | 2011-4 | 2011-4 | | | | | |
| Sample Number | 1 | 2 | 3 | 4 | | | | | |
| Cup Number | 18 | 30 | 17 | 26 | | | | | |
| Weight of Cup (g) | 15.74 | 15.91 | 15.82 | 15.79 | | | | | |
| Weight of Wet Soil and Cup (g) | 48.42 | 41.93 | 49.19 | 67.73 | | | | | |
| Weight of Dry Soil and Cup (g) | 40.63 | 36.14 | 42.15 | 57.98 | | | | | |
| Weight of Soil and Cup After Burn (g) | | | | | | | | | |
| Weight of Sample for Density (lbs) | | | | | | | | | |
| Diameter (in) | | | | | | | | | |
| Length(in) | | | | | | | | | |
| Moisture Content (%) | 31.3 | 28.6 | 26.7 | 23.1 | | | | | |
| Organic Content (%) | | | | | | | | | |
| Wet Density (pcf) | | | | | | | | | |
| Dry Density (pcf) | | | | | | | | | |

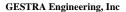




Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

| Project Name: | Waukesha B | ypass | | | Date: | 3/1 & 3/25/2011 CH2M HILL | | | |
|---------------------------------------|---------------|--------|--------|----------|------------|------------------------------|---|---|--|
| Project Number: | 10031-10 | | | _ | Report To: | | | | |
| Project Location: | Waukesha, V | VI | | | - | | | | |
| ASTM Designation: | D2216, D 2974 | | | <u>.</u> | | | | | |
| | | | | | | | | | |
| Boring Number | 2011-5 | 2011-5 | 2011-5 | 2011-5 | 2011-5 | | | | |
| Sample Number | 1 | 2 | 3 | 4 | 6 | | | | |
| Cup Number | CUP 6 | 321 | S-17 | S-4 | 35 | | | | |
| Weight of Cup (g) | 35.87 | 16.88 | 16.76 | 15.70 | 17.03 | | | | |
| Weight of Wet Soil and Cup (g) | 61.45 | 68.21 | 51.65 | 53.35 | 63.87 | | | | |
| Weight of Dry Soil and Cup (g) | 52.33 | 59.68 | 44.74 | 46.52 | 56.18 | | | | |
| Weight of Soil and Cup After Burn (g) | 50.33 | | | | | | | | |
| Weight of Sample for Density (lbs) | | | | | | | | | |
| Diameter (in) | | | | | | | | | |
| Length(in) | | | | | | | | | |
| Moisture Content (%) | 55.4 | 19.9 | 24.7 | 22.2 | 19.6 | | | | |
| Organic Content (%) | 12.2 | | | | | | | | |
| Wet Density (pcf) | | | | | | | | | |
| Dry Density (pcf) | | | | | | | | | |
| | | | | | | | | | |
| Boring Number | 2011-6 | 2011-6 | 2011-6 | 2011-6 | 2011-6 | 2011-6 | | | |
| Sample Number | 1 | 2A | 2B | 4 | 5 | 6 | | | |
| Cup Number | CUP 5 | PC-3 | PC-1 | 113 | S-23 | 13 | | | |
| Weight of Cup (g) | 34.99 | 25.96 | 20.25 | 16.80 | 16.73 | 15.77 | | · | |
| Weight of Wet Soil and Cup (g) | 57.13 | 44.90 | 47.13 | 50.49 | 42.84 | 74.04 | | | |
| Weight of Dry Soil and Cup (g) | 39.15 | 29.72 | 36.66 | 45.06 | 38.37 | 69.58 | | | |
| Weight of Soil and Cup After Burn (g) | 36.32 | 27.65 | 36.01 | | | | | | |
| Weight of Sample for Density (lbs) | | | | | | | | | |
| Diameter (in) | | | | | | | | | |
| Length(in) | | | | | | | | | |
| Moisture Content (%) | 432.2 | 403.7 | 63.8 | 19.2 | 20.7 | 8.3 | | | |
| Organic Content (%) | 68.0 | 55.1 | 4.0 | | | | | | |
| Wet Density (pcf) | | | | | | | | | |
| Dry Density (pcf) | | | | | | | _ | | |

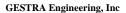




Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

| Project Name: | Waukesha By | ypass | | | Date: | 3/1 & 3/25/2011 | | | | |
|---------------------------------------|---------------|--------|--------|--------|------------|-----------------|--|--|--|--|
| Project Number: | 10031-10 | | | - | Report To: | CH2M HILL | | | | |
| Project Location: | Waukesha, V | VT | | - | | | | | | |
| ASTM Designation: | D2216, D 2974 | | | - | | | | | | |
| ASTW Designation. | D2210, D 2974 | | | - | | | | | | |
| | | | | | | | | | | |
| Boring Number | 2011-7 | 2011-7 | 2011-7 | 2011-7 | | | | | | |
| Sample Number | 1 | 2 | 3 | 4 | | | | | | |
| Cup Number | CUP 14 | 25 | S-22 | S-10 | | | | | | |
| Weight of Cup (g) | 22.38 | 15.81 | 16.72 | 16.94 | | | | | | |
| Weight of Wet Soil and Cup (g) | 44.65 | 51.38 | 73.24 | 70.25 | | | | | | |
| Weight of Dry Soil and Cup (g) | 31.28 | 45.03 | 64.58 | 57.59 | | | | | | |
| Weight of Soil and Cup After Burn (g) | 29.55 | | | | | | | | | |
| Weight of Sample for Density (lbs) | | | | | | | | | | |
| Diameter (in) | | | | | | | | | | |
| Length(in) | | | | | | | | | | |
| Moisture Content (%) | 150.2 | 21.7 | 18.1 | 31.1 | | | | | | |
| Organic Content (%) | 19.4 | | | | | | | | | |
| Wet Density (pcf) | | | | | | | | | | |
| Dry Density (pcf) | | | | | | | | | | |
| | | | | | | | | | | |
| Boring Number | 2011-8 | 2011-8 | 2011-8 | 2011-8 | 2011-8 | 2011-8 | | | | |
| Sample Number | 1 | 2 | 3 | 4 | 5 | 6 | | | | |
| Cup Number | S-12 | 33 | 1 | A-26 | F1 | S-16 | | | | |
| Weight of Cup (g) | 16.82 | 15.66 | 15.79 | 15.92 | 12.72 | 16.36 | | | | |
| Weight of Wet Soil and Cup (g) | 44.80 | 50.64 | 49.98 | 91.77 | 84.06 | 52.96 | | | | |
| Weight of Dry Soil and Cup (g) | 39.75 | 46.13 | 44.76 | 79.93 | 78.06 | 49.44 | | | | |
| Weight of Soil and Cup After Burn (g) | | | | | | | | | | |
| Weight of Sample for Density (lbs) | | | | | | | | | | |
| Diameter (in) | | | | | | | | | | |
| Length(in) | | | | | | | | | | |
| Moisture Content (%) | 22.0 | 14.8 | 18.0 | 18.5 | 9.2 | 10.6 | | | | |
| Organic Content (%) | | | | | | | | | | |
| Wet Density (pcf) | | | | | | | | | | |
| Dry Density (pcf) | | | | | | | | | | |

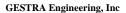




Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

| Project Name: | Waukesha B | ypass | | | Date: | 3/1 & 3/25/2 | 011 | |
|---------------------------------------|----------------|---------------|---------|------------|-----------|--------------|-----|--|
| Project Number: | nber: 10031-10 | | - | Report To: | CH2M HILL | | | |
| Project Location: | Waukesha, V | VI | | - | • | | | |
| ASTM Designation: | | D2216, D 2974 | | | | | | |
| | | | | • | | | | |
| Boring Number | 2011-9 | 2011-9 | 2011-9 | 2011-9 | 2011-9 | | | |
| Sample Number | 1 | 2 | 3 | 4 | 6 | | | |
| Cup Number | CUP A | 29 | S-1 | B-11 | B-2 | | | |
| Weight of Cup (g) | 20.26 | 15.84 | 16.62 | 14.50 | 14.32 | | | |
| Weight of Wet Soil and Cup (g) | 57.55 | 52.07 | 46.72 | 58.01 | 54.60 | | | |
| Weight of Dry Soil and Cup (g) | 47.92 | 43.76 | 41.39 | 50.66 | 48.44 | | | |
| Weight of Soil and Cup After Burn (g) | 46.56 | | | | | | | |
| Weight of Sample for Density (lbs) | | | | | | | | |
| Diameter (in) | | | | | | | | |
| Length(in) | | | | | | | | |
| Moisture Content (%) | 34.8 | 29.8 | 21.5 | 20.3 | 18.1 | | | |
| Organic Content (%) | 4.9 | | | | | | | |
| Wet Density (pcf) | | | | | | | | |
| Dry Density (pcf) | | | | | | | | |
| | | | | | | | | |
| Boring Number | 2011-10 | 2011-10 | 2011-10 | | | | | |
| Sample Number | 1 | 2 | 3 | | | | | |
| Cup Number | B9 | 22 | S-19 | | | | | |
| Weight of Cup (g) | 14.10 | 15.83 | 16.01 | | | | | |
| Weight of Wet Soil and Cup (g) | 51.05 | 45.12 | 43.55 | | | | | |
| Weight of Dry Soil and Cup (g) | 44.78 | 38.63 | 40.88 | | | | | |
| Weight of Soil and Cup After Burn (g) | | | | | | | | |
| Weight of Sample for Density (lbs) | | | | | | | | |
| Diameter (in) | | | | | | | | |
| Length(in) | | | | | | | | |
| Moisture Content (%) | 20.4 | 28.5 | 10.7 | | | | | |
| Organic Content (%) | | | | | | | | |
| Wet Density (pcf) | | | | | | | | |
| Dry Density (pcf) | _ | | | | | | | |





Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

| Project Name: | Waukesha Bypass | | Date: | | 3/1 & 3/25/2011 Co: CH2M HILL | | | |
|---------------------------------------|-----------------|---------|------------|---------|----------------------------------|--|--|--|
| Project Number: 10031-10 | | _ | Report To: | | | | | |
| Project Location: | Waukesha, V | VI | | - | • | | | |
| ASTM Designation: | D2216, D 2974 | | | - | | | | |
| | | | | - | | | | |
| Boring Number | 2011-11 | 2011-11 | 2011-11 | 2011-11 | | | | |
| Sample Number | 1 | 2 | 4 | 5 | | | | |
| Cup Number | 27 | 23 | S-13 | В6 | | | | |
| Weight of Cup (g) | 15.62 | 15.93 | 16.54 | 14.05 | | | | |
| Weight of Wet Soil and Cup (g) | 52.56 | 66.00 | 73.41 | 78.55 | | | | |
| Weight of Dry Soil and Cup (g) | 45.78 | 60.29 | 68.07 | 73.09 | | | | |
| Weight of Soil and Cup After Burn (g) | | | | | | | | |
| Weight of Sample for Density (lbs) | | | | | | | | |
| Diameter (in) | | | | | | | | |
| Length(in) | | | | | | | | |
| Moisture Content (%) | 22.5 | 12.9 | 10.4 | 9.2 | | | | |
| Organic Content (%) | | | | | | | | |
| Wet Density (pcf) | | | | | | | | |
| Dry Density (pcf) | | | | | | | | |
| | | | | | | | | |
| Boring Number | | | | | | | | |
| Sample Number | | | | | | | | |
| Cup Number | | | | | | | | |
| Weight of Cup (g) | | | | | | | | |
| Weight of Wet Soil and Cup (g) | | | | | | | | |
| Weight of Dry Soil and Cup (g) | | | | | | | | |
| Weight of Soil and Cup After Burn (g) | | | | | | | | |
| Weight of Sample for Density (lbs) | | | | | | | | |
| Diameter (in) | | | | | | | | |
| Length(in) | | | | | | | | |
| Moisture Content (%) | | | | | | | | |
| Organic Content (%) | | | | | | | | |
| Wet Density (pcf) | | | | | | | | |
| Dry Density (pcf) | | | | | | | | |





Project Number:

1626 W. Fond Du Lac Ave. Milwaukee, WI 53205 Phone: (414) 933-7444, Fax: (414) 933-7844

Laboratory Test Results of Unconfined Compressive Strength of Soil

Project Name: Waukesha Bypass

10031-10

Project Location: Waukesha, WI

ASTM Designation: **D2166**

Sample Information

350

400

450 500

550

600

650

700

750

800

849

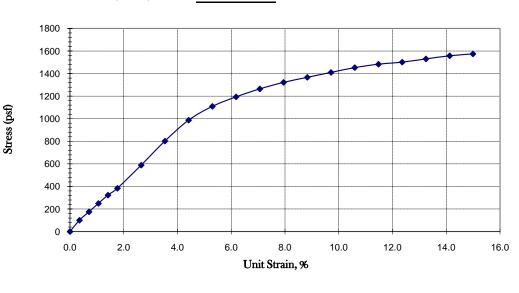
 Boring no.:
 2011-1
 Diameter (in)
 2.81

 Sample no.:
 2
 Area (sq. in.):
 6.19

 Depth of Soil:
 2-4'
 Height: (in.):
 5.66

Description of Soil: LEAN CLAY, gray to green with yellow mottling, wet

Strain Rate (in/min): 0.042





| UC Strength, Q _u (tsf) | 0.79 |
|-----------------------------------|-------|
| Wet Density (pcf) | 126.8 |
| Dry Density (pcf) | 102.4 |
| Moisture Content (%) | 23.8 |

1194

1265

1322

1367

1411

1453

1483

1502

1530

1558

1575

Remarks

Performed By: JB

Reviewed By: E. Jeske

Date:

Report To:

March 25, 2011

CH2MHill



GESTRA Engineering, Inc

1626 W. Fond Du Lac Ave. Milwaukee, WI 53205 Phone: (414) 933-7444, Fax: (414) 933-7844

Laboratory Test Results of Unconfined Compressive Strength of Soil

Date:

Report To:

March 25, 2011

CH2MHill

Project Name: Waukesha Bypass

10031-10

Project Location: Waukesha, WI

Sample

stress

(psf)

0

114

201

301

387

473 678

904

1077

1187

1283

1353

1422

1466

1509

1551

1592

1620

1648

1675

1700

ASTM Designation: **D2166**

Test Data

Deformation

dial

reading

(0.001 in.)

0

20

40

60

80

100

150

200

250

300

350

400

450 500

550

600

650

700

750

800

851

Project Number:

Sample Information

 Boring no.:
 2011-2
 Diameter (in)
 2.80

 Sample no.:
 2
 Area (sq. in.):
 6.16

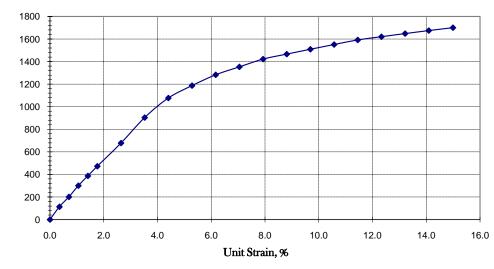
 Depth of Soil:
 2-4'
 Height: (in.):
 5.68

Description of Soil: LEAN CLAY, gray to green with yellow motttling, wet

Strain Rate (in/min): 0.042



Stress (pst)

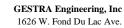




| UC Strength, Qu (tsf) | 0.85 |
|-----------------------|-------|
| Wet Density (pcf) | 124.5 |
| Dry Density (pcf) | 91.1 |
| Moisture Content (%) | 36.7 |

Remarks

Performed By: JB Reviewed By: E. Jeske



Milwaukee, WI 53205 Phone: (414) 933-7444, Fax: (414) 933-7844



Laboratory Test Results of Unconfined Compressive Strength of Soil

Project Name: Waukesha Bypass Date: Report To:

March 28, 2011 CH2M HILL

Project Location:

Project Number:

Deformation

dial

reading

(0.001 in.)

0

20

40

60

80

100

150

200

250

300

350

400 450

500

550

600

650

700

Waukesha, WI

Sample

stress

(psf)

0

63

107

161

246

327

486

604

704

782

836 882

908

935

943

940

936

917

ASTM Designation:

D2166

10031-10

Sample Information Test Data

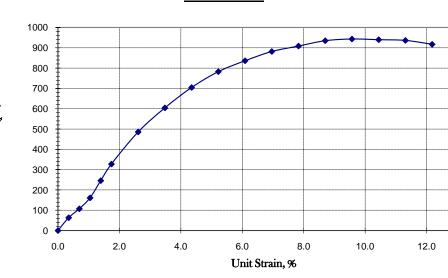
Boring no.: Sample no.: Depth of Soil:

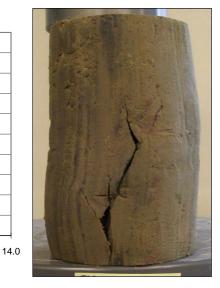
2011-3 Diameter (in) 2.79 6.13 Area (sq. in.): 2'-4' Height: (in.): 5.75

Description of Soil:

LEAN CLAY, with silt and sand pockets, blueish gray with brown mottling, moist

Strain Rate (in/min): 0.042



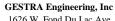


| UC Strength, Q _u (tsf) | 0.47 |
|-----------------------------------|-------|
| Wet Density (pcf) | 135.8 |
| Dry Density (pcf) | 114.5 |
| Moisture Content (%) | 18.6 |
| | |

Remarks Sample displayed one significant vertical shear fracture. Qp = 0.25 - 0.75

Performed By: SF

Reviewed By: E. Jeske



1626 W. Fond Du Lac Ave. Milwaukee, WI 53205 Phone: (414) 933-7444, Fax: (414) 933-7844

Laboratory Test Results of Unconfined Compressive Strength of Soil

Project Name: Waukesha Bypass

10031-10

Date: April 1, 2011

CH2M HILL

Report To:

Project Location: Waukesha, WI

ASTM Designation: D2166

Project Number:

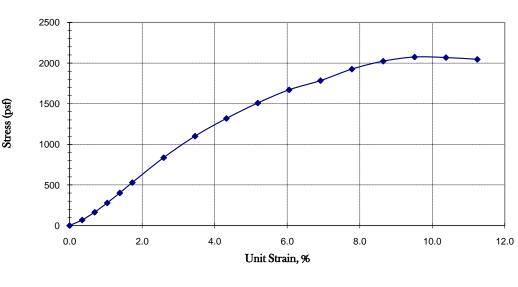
| Test Data | |
|-------------|--------|
| Deformation | Sample |
| dial | stress |
| reading | |
| (0.001 in.) | (psf) |
| 0 | 0 |
| 20 | 69 |
| 40 | 164 |
| 60 | 279 |
| 80 | 402 |
| 100 | 529 |
| 150 | 836 |
| 200 | 1101 |
| 250 | 1319 |
| 300 | 1509 |
| 350 | 1671 |
| 400 | 1784 |
| 450 | 1926 |
| 500 | 2024 |
| 550 | 2075 |
| 600 | 2068 |
| 650 | 2046 |

Sample Information

Boring no.: Diameter (in) 2011-5 2.82 6.22 Sample no.: Area (sq. in.): 2'-4' Depth of Soil: Height: (in.): 5.78

Description of Soil: LEAN CLAY, gray to reddish brown/ rusty brown, moist

Strain Rate (in/min): 0.042

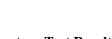




Sample displayed one significant "v" shaped fracture. $Q_p = 0.5 - 1.0$ Remarks

UC Strength, Q₁₁ (tsf) 1.04 Wet Density (pcf) 134.2 111.9 Dry Density (pcf) Moisture Content (%) 19.9

Performed By: SF Reviewed By: E. Jeske



GESTRA Engineering, Inc 1626 W. Fond Du Lac Ave. Milwaukee, WI 53205 Phone: (414) 933-7444, Fax: (414) 933-7844

Laboratory Test Results of Unconfined Compressive Strength of Soil

Project Name: Waukesha Bypass

Stress (pst)

0.77

Date: April 4, 2011

Project Number: 10031-10 Report To: CH2M HILL

Project Location: Waukesha, WI **ASTM Designation:** D2166

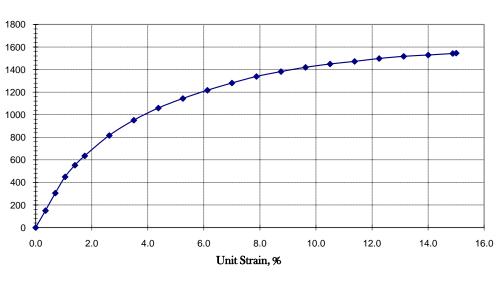
| Test Data | |
|-------------|--------|
| Deformation | Sample |
| dial | stress |
| reading | |
| (0.001 in.) | (psf) |
| 0 | 0 |
| 20 | 150 |
| 40 | 305 |
| 60 | 449 |
| 80 | 552 |
| 100 | 635 |
| 150 | 816 |
| 200 | 951 |
| 250 | 1059 |
| 300 | 1144 |
| 350 | 1217 |
| 400 | 1281 |
| 450 | 1339 |
| 500 | 1382 |
| 550 | 1420 |
| 600 | 1449 |
| 650 | 1472 |
| 700 | 1498 |
| 750 | 1517 |
| 800 | 1529 |

850

Sample Information

| Boring no.: | 2011-9 | Diameter (in) | 2.75 |
|----------------------|----------|---------------------|--------------------|
| Sample no.: | 2 | Area (sq. in.): | 5.96 |
| Depth of Soil: | 2'-4' | Height: (in.): | 5.71 |
| Description of Soil: | LEAN CLA | Y. dark brown and b | lueish gray, moist |

Strain Rate (in/min): 0.042





Remarks

Sample displayed minimal signs of shear stress. $Q_n = 0.5 - 1.0$

UC Strength, Q_u (tsf) 125.6 Wet Density (pcf) 96.8 Dry Density (pcf) Moisture Content (%) 29.8

1542

Performed By: SF

Reviewed By: E. Jeske





Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

Laboratory Test Results of Mechanical Analysis of Soil or Aggregate

| Project Name: | Waukesha By-Pass |
|-----------------|------------------|
| Project Number: | 10031-10 |

Project Location: Waukesha Co., WI

ASTM Designation: C136, D422

Sample Information

Type of Sample: Split Spoon Sample Number: 3

Boring Number: 2011-3 Depth of Sample: 6'-7.5'

Date:

April 18, 2011

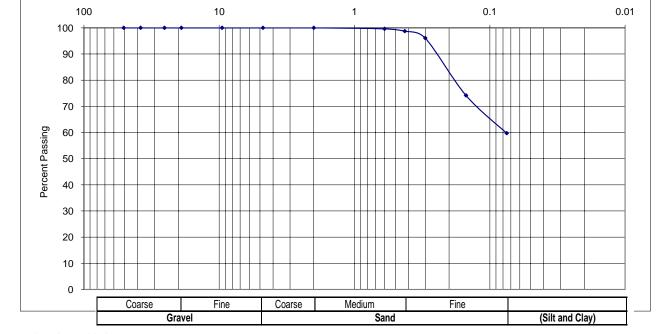
Particle Diameter (mm)

Reported To: CH2M Hill

Mechanical Analysis Data

| | Sieve | Percent |
|-----------|---------|---------|
| Sieve | Opening | Passing |
| | (mm) | (%) |
| 2 in. | 50.8 | 100 |
| 1 1/2 in. | 38.1 | 100 |
| 1 in. | 25.4 | 100 |
| 3/4 in. | 19.05 | 100 |
| 3/8 in. | 9.525 | 100 |
| #4 | 4.75 | 100 |
| #10 | 2 | 100 |
| #30 | 0.6 | 100 |
| #40 | 0.425 | 98.7 |
| #50 | 0.3 | 96.1 |
| #100 | 0.15 | 74.2 |
| #200 | 0.075 | 59.7 |

Moisture Content 19.3 %



 Remarks:
 Gravel
 0.0
 %
 Sand
 40.3
 %

 Passing #200 Sieve (Silt & Clay)
 59.7
 %

Performed by: ESJ

Reviewed by: E. Jeske





Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

Laboratory Test Results of Mechanical Analysis of Soil or Aggregate

| Project Name: | Waukesha By-Pass |
|-----------------|------------------|
| Project Number: | 10031-10 |

Waukesha Co., WI **Project Location:**

C136, D422 **ASTM Designation:**

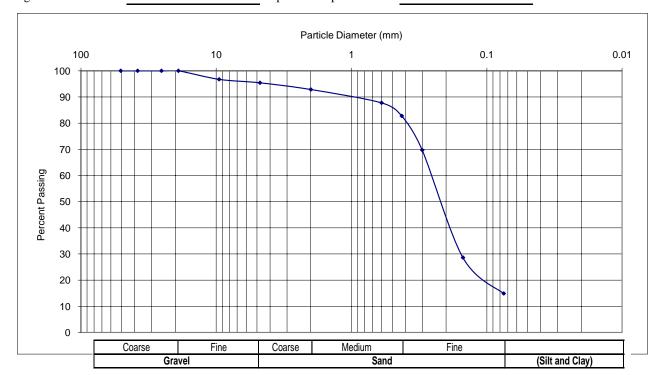
Sample Information

Sample Number: Type of Sample: Split Spoon Boring Number: 2011-1 Depth of Sample: 6'-7.5'

Date:

Mechanical Analysis Data

| Sieve | Sieve Opening | Percent Passing |
|-----------|------------------|--------------------|
| | (mm) | (%) |
| 2 in. | 50.8 | 100 |
| 1 1/2 in. | 38.1 | 100 |
| 1 in. | 25.4 | 100 |
| 3/4 in. | 19.05 | 100 |
| 3/8 in. | 9.525 | 96.7 |
| #4 | 4.75 | 95.4 |
| #10 | 2 | 92.9 |
| #30 | 0.6 | 87.8 |
| #40 | 0.425 | 82.8 |
| #50 | 0.3 | 69.7 |
| #100 | 0.15 | 28.6 |
| #200 | 0.075 | 14.9 |



April 18, 2011

Reported To: CH2M Hill

80.5 Remarks: Gravel Sand 4.6 % % Passing #200 Sieve (Silt & Clay) 14.9 %

Performed by: **ESJ** Reviewed by: E. Jeske





Milwaukee, WI 53205

Phone: (414) 933-7444; Fax: (414) 933-7844

Laboratory Test Results of Mechanical Analysis of Soil or Aggregate

Project Name: Waukesha By-Pass

Date: April 18, 2011

Project Number:

10031-10

Project Location: Waukesha Co., WI

Reported To: CH2M Hill

ASTM Designation:

C136, D422

Sample Information

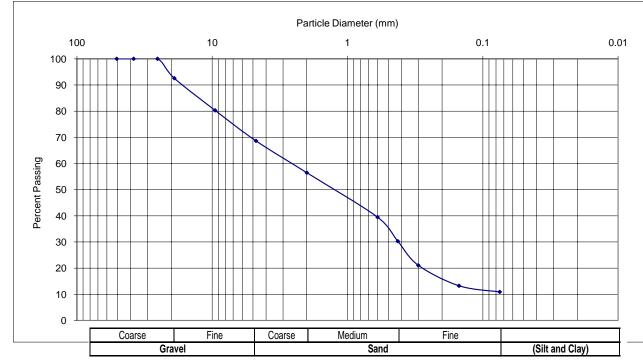
Type of Sample: Split Spoon
Boring Number: 2011-6

Sample Number: 3
Depth of Sample: 6'-

6'-7.5'

Mechanical Analysis Data

| Sieve | Sieve Opening (mm) | Percent Passing (%) |
|-----------|--------------------------|---------------------------|
| 2 in. | 50.8 | 100 |
| 1 1/2 in. | 38.1 | 100 |
| 1 in. | 25.4 | 100 |
| 3/4 in. | 19.05 | 93 |
| 3/8 in. | 9.525 | 80.3 |
| #4 | 4.75 | 68.6 |
| #10 | 2 | 56.5 |
| #30 | 0.6 | 39.5 |
| #40 | 0.425 | 30.3 |
| #50 | 0.3 | 21.1 |
| #100 | 0.15 | 13.3 |
| #200 | 0.075 | 10.9 |



 Remarks:
 Gravel
 31.4
 %
 Sand
 57.7
 %

 Passing #200 Sieve (Silt & Clay)
 10.9
 %

Performed by: ESJ

Reviewed by: E. Jeske